Vol. XXIX AUGUST 1935 Number 8

EXCAVATING ENGINEER

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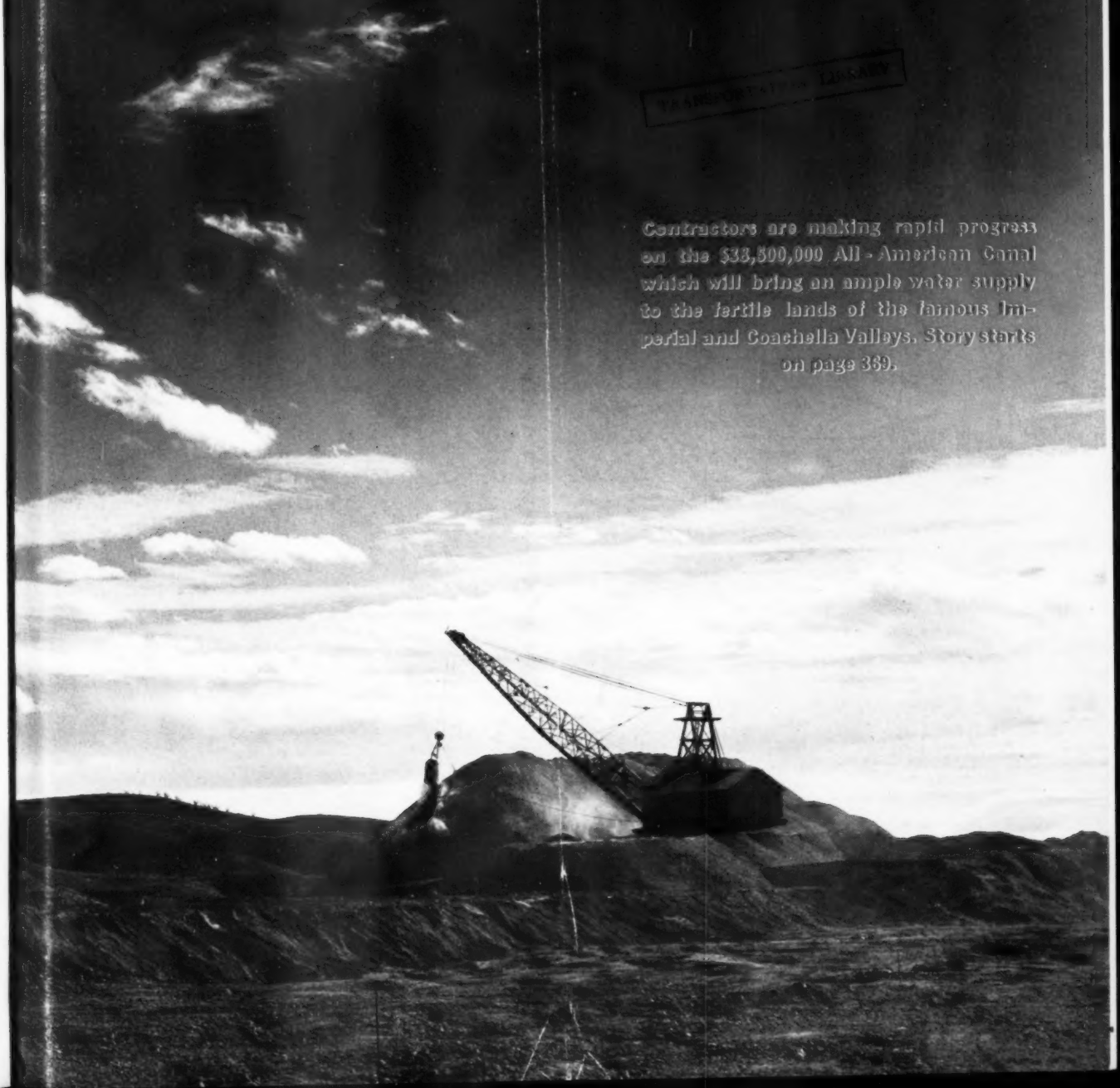
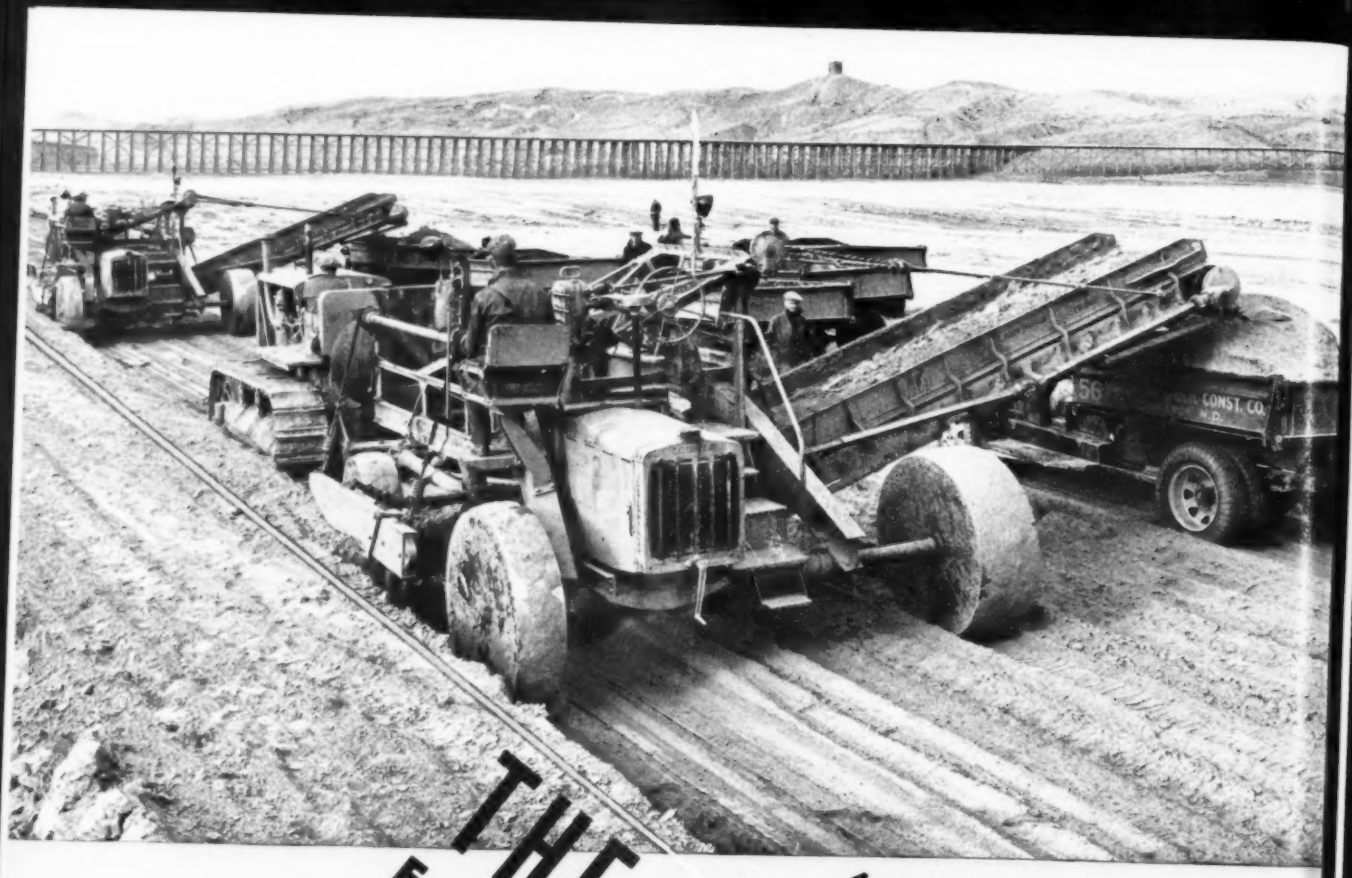


Contractors are making rapid progress on the $38,500,000 All-American Canal which will bring an ample water supply to the fertile lands of the famous Imperial and Coachella Valleys. Story starts on page 369.



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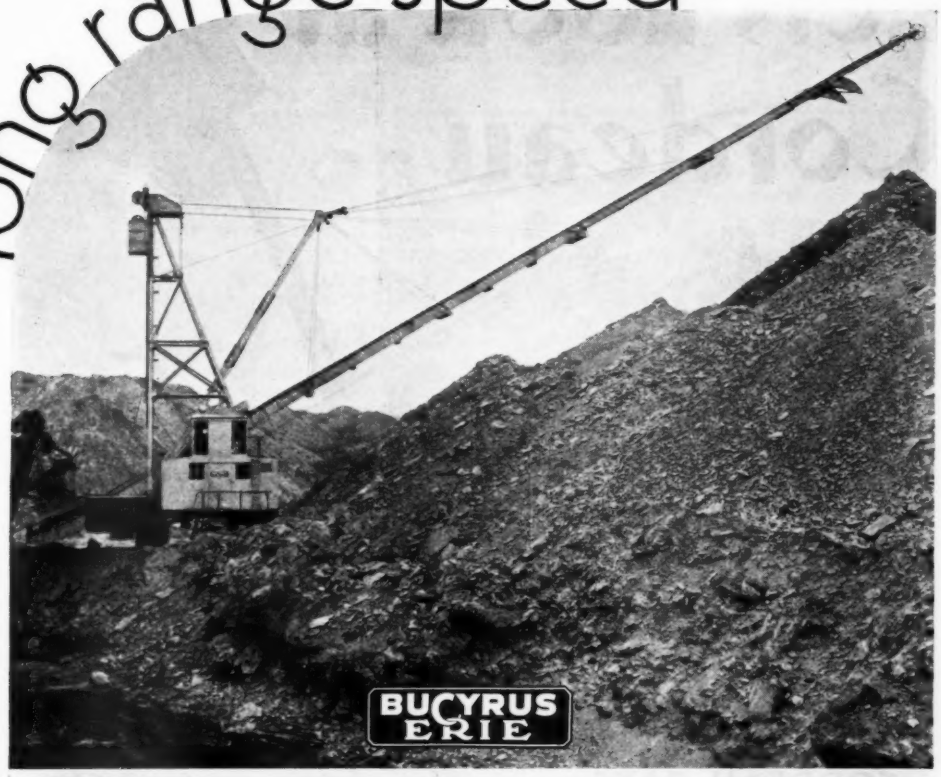

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BUCYRUS-ERIE

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EXCAVATING ENGINEER

DEVOTED EXCLUSIVELY TO EXCAVATION

About Excavating Projects — By Excavating Men — For Excavating Men — The World Over

Vol. 29 AUGUST, 1935 No. 8

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Building Fort Peck Dam.

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Grade Separation Improves Approach to Delaware River Bridge.

Builders, Inc., construct 1400-foot underpass beneath new high-speed trolley tube in Philadelphia.

Old Spanish Trail Goes Modern.

W. W. Vann & Company, Mercedes, Texas complete 10-mile section of famous trail in quick time.

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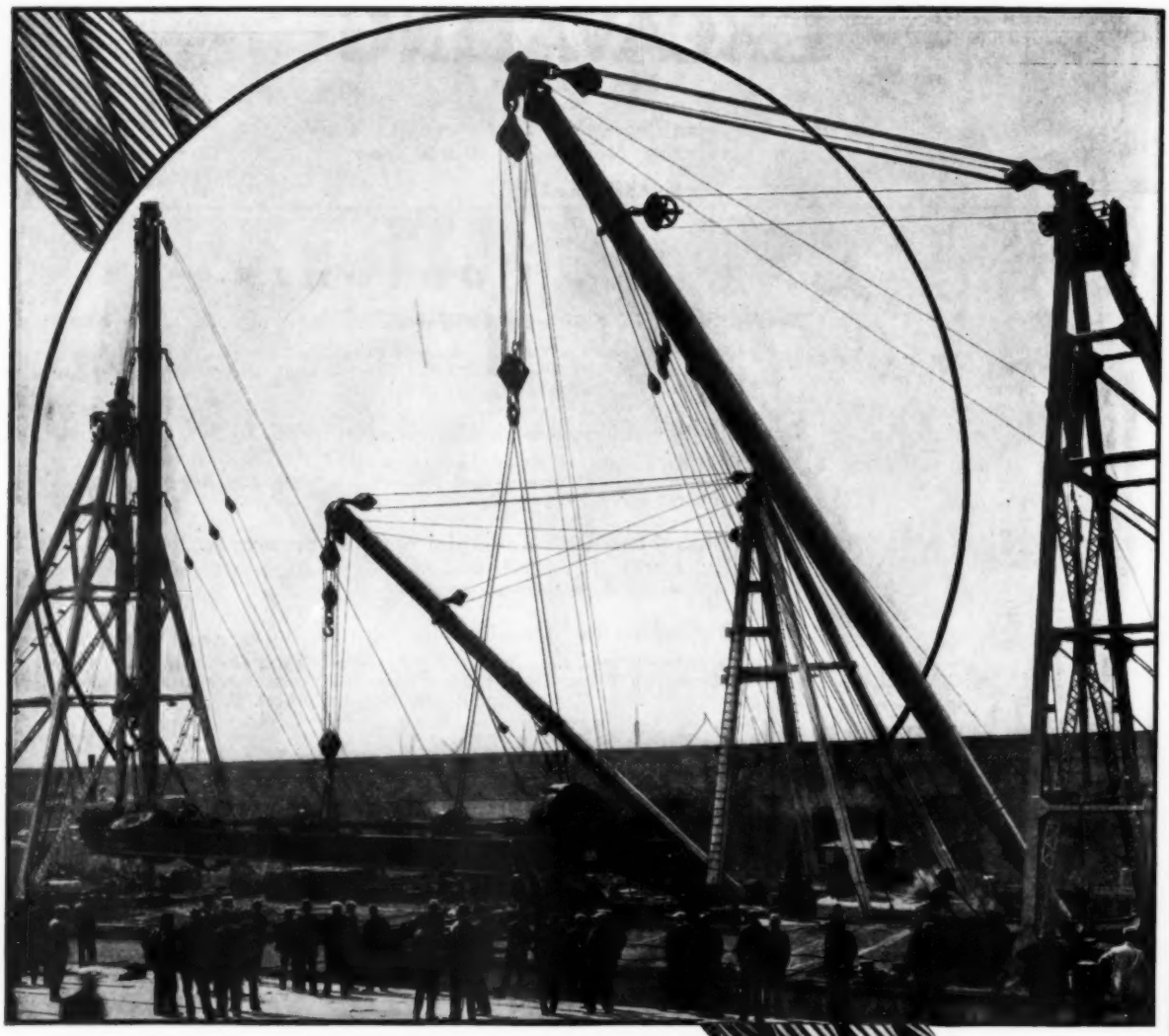

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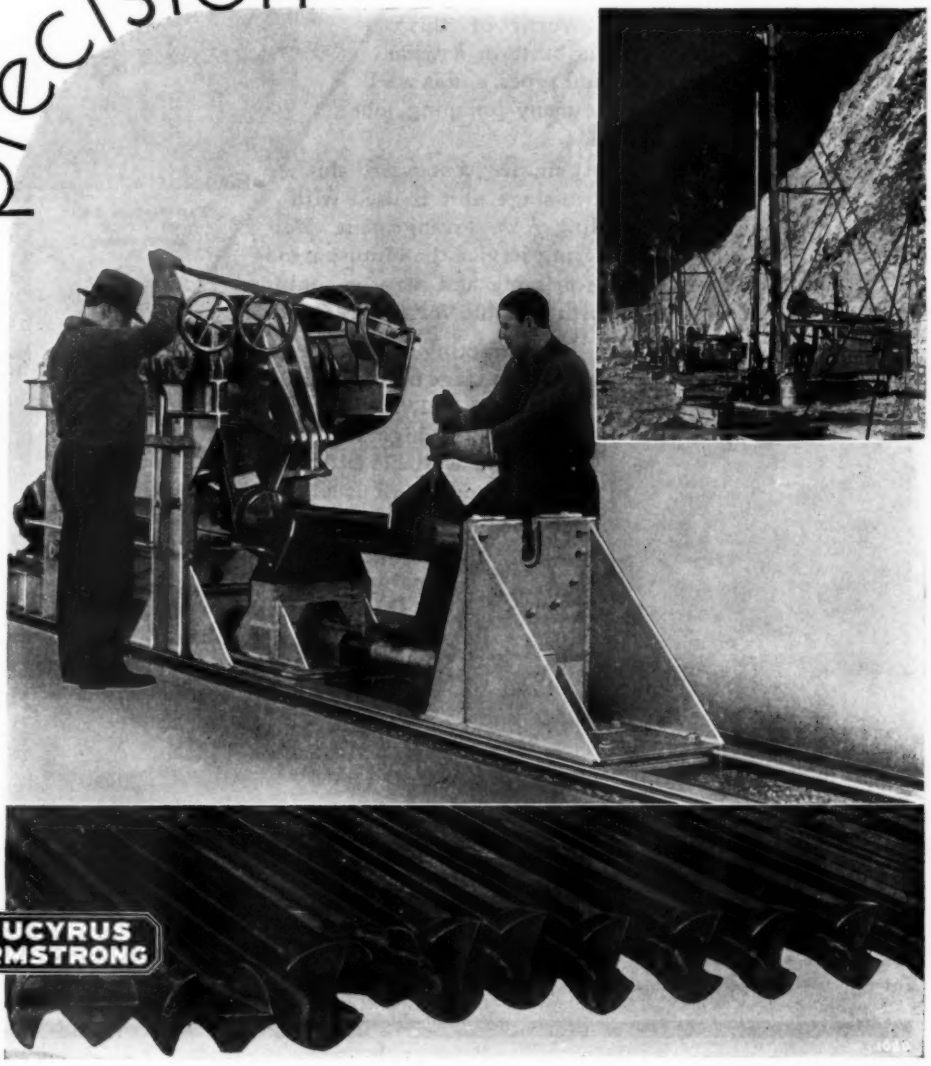

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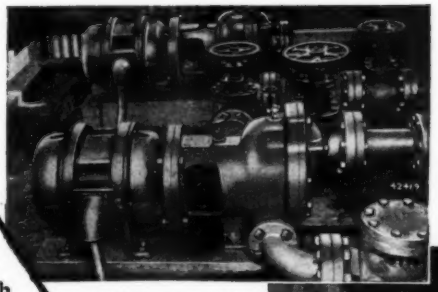
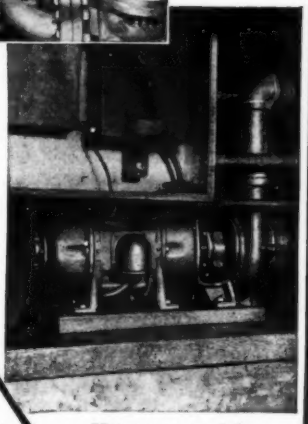
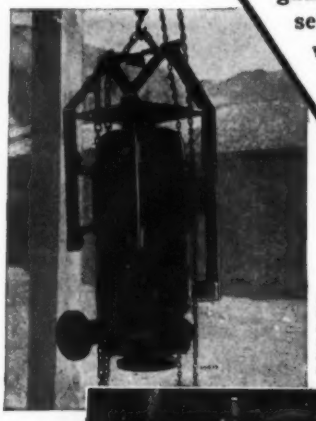


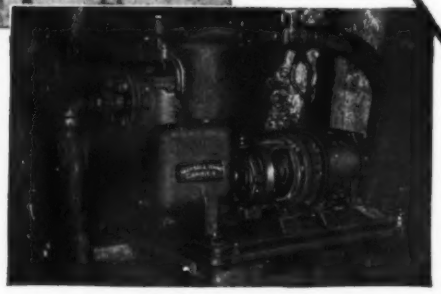
Two 2-stage units on a large construction job.



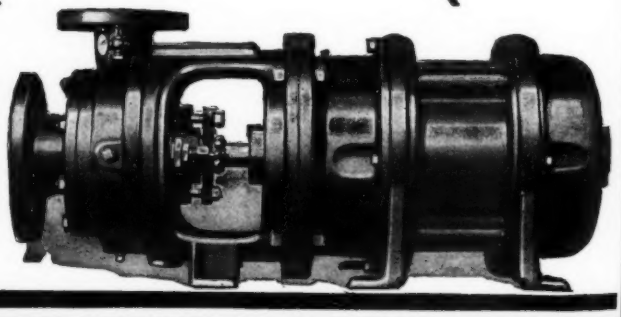
Motorpump used for dewatering a coffer dam.



Motorpump equipped with sling yoke for shaft sinking service.



Self-priming unit in a coal mine.



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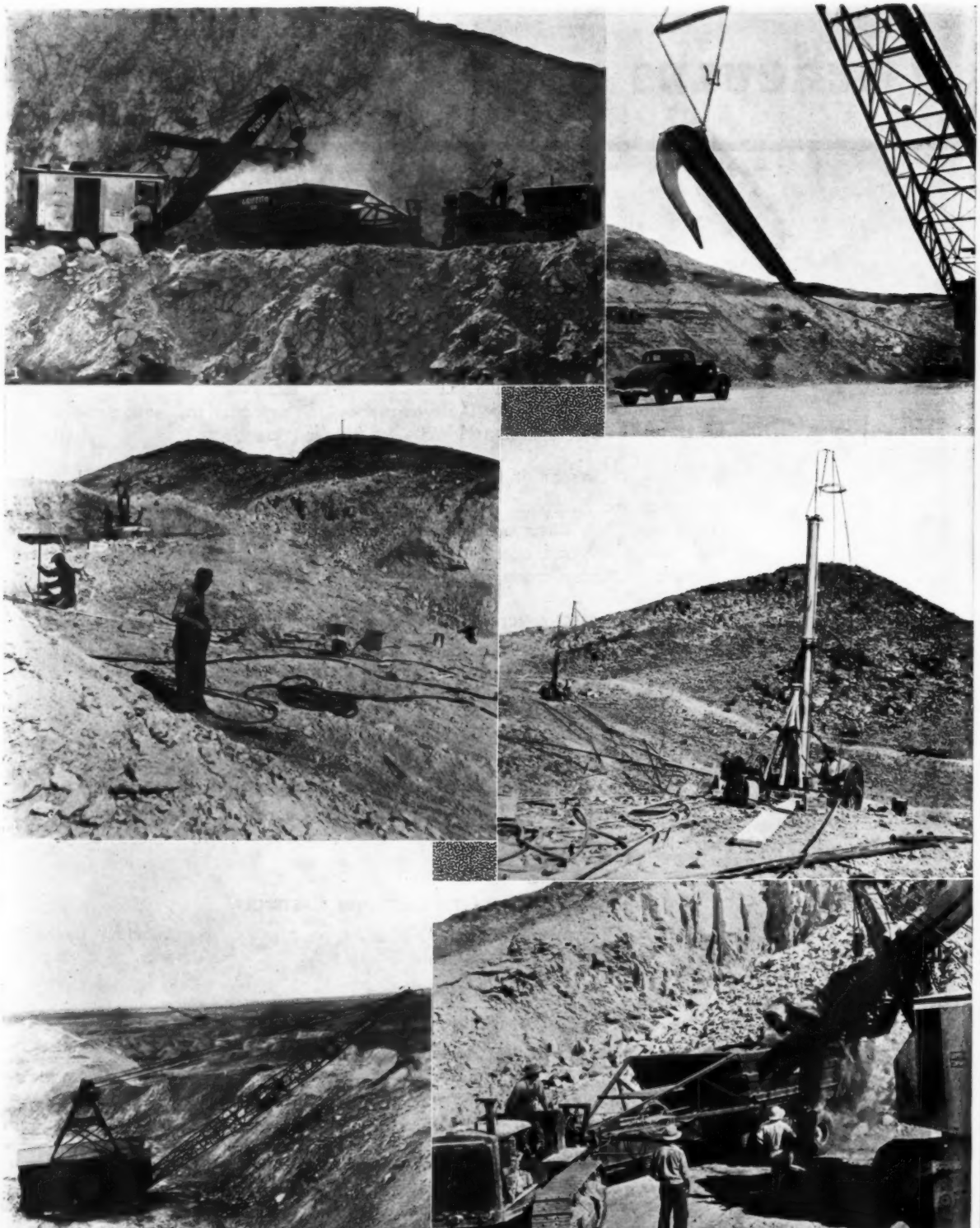
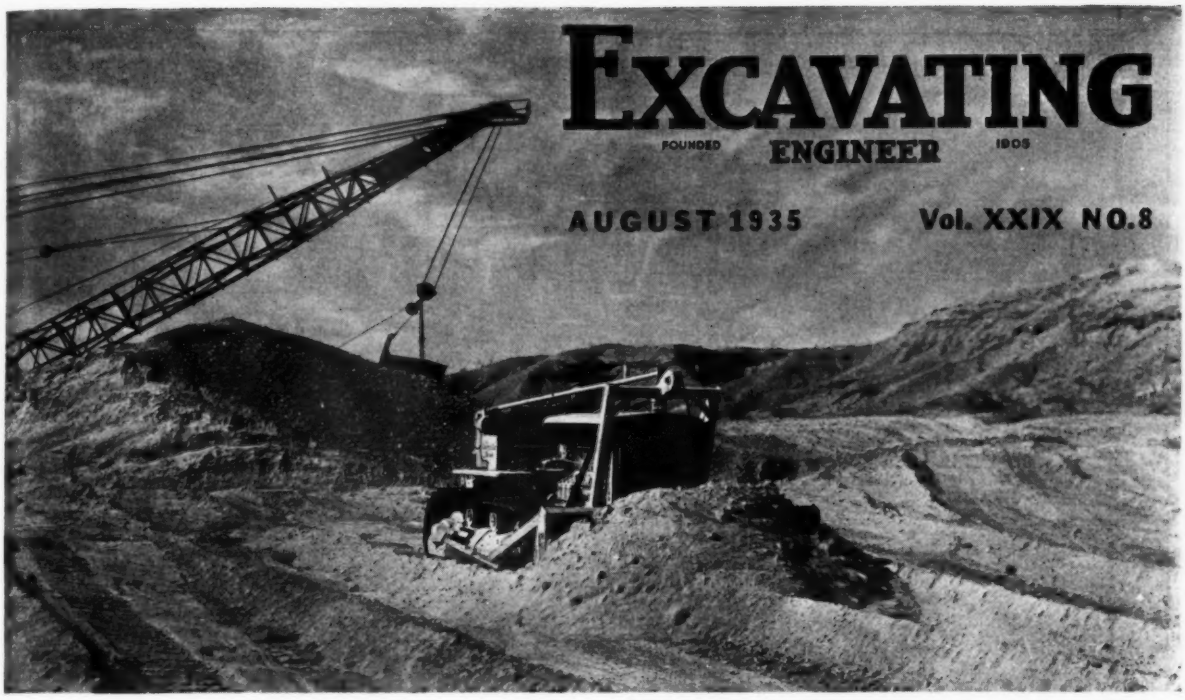


● *1. While most of the 80-mile All-American Canal lies in sand or gravel, two short sections near Pilot Knob are being excavated through rock by the Griffith Company. Their Bucyrus-Erie 43-B Diesel-powered shovel loads to 25-yd. LeTourneau buggies pulled by Caterpillar Diesel 75's* ● *2. A close-up of the "fishhook," designed by Maj. L. D. Crawford of the W. E. Callahan Construction Company, used to rip up patches of cemented gravel.* ● *3. Drillers working on Callahan Company's contract sink holes 10 to 12 feet deep with Ingersoll-Rand Jackhammers.* ● *4. Griffith Company uses two Cleveland wagon drills to put down 25-to 30-foot holes on their 500,000-yard rock contract.* ● *5. The dragline operator swings the hook out over a patch of cemented gravel and draws it in just as though it were a bucket.* ● *6. Griffith's 43-B shovel digs into a pile of blasted rock.*



● *This Caterpillar Diesel 75, equipped with a LeTourneau bulldozer, smooths off the sand ridges ahead of Boyce & Igo's 10-W Bucyrus-Monighan dragline.*

Draglines Speed Progress on All-American Canal

Contractors W. E. Callahan, H. Gunther, and J. P. Shirley and sub-contractor Boyce & Igo use seven Bucyrus-Monighan draglines of 12, 6, and 3 yards capacity on 40,000,000-yard project

By **JOSEPH C. COYLE**

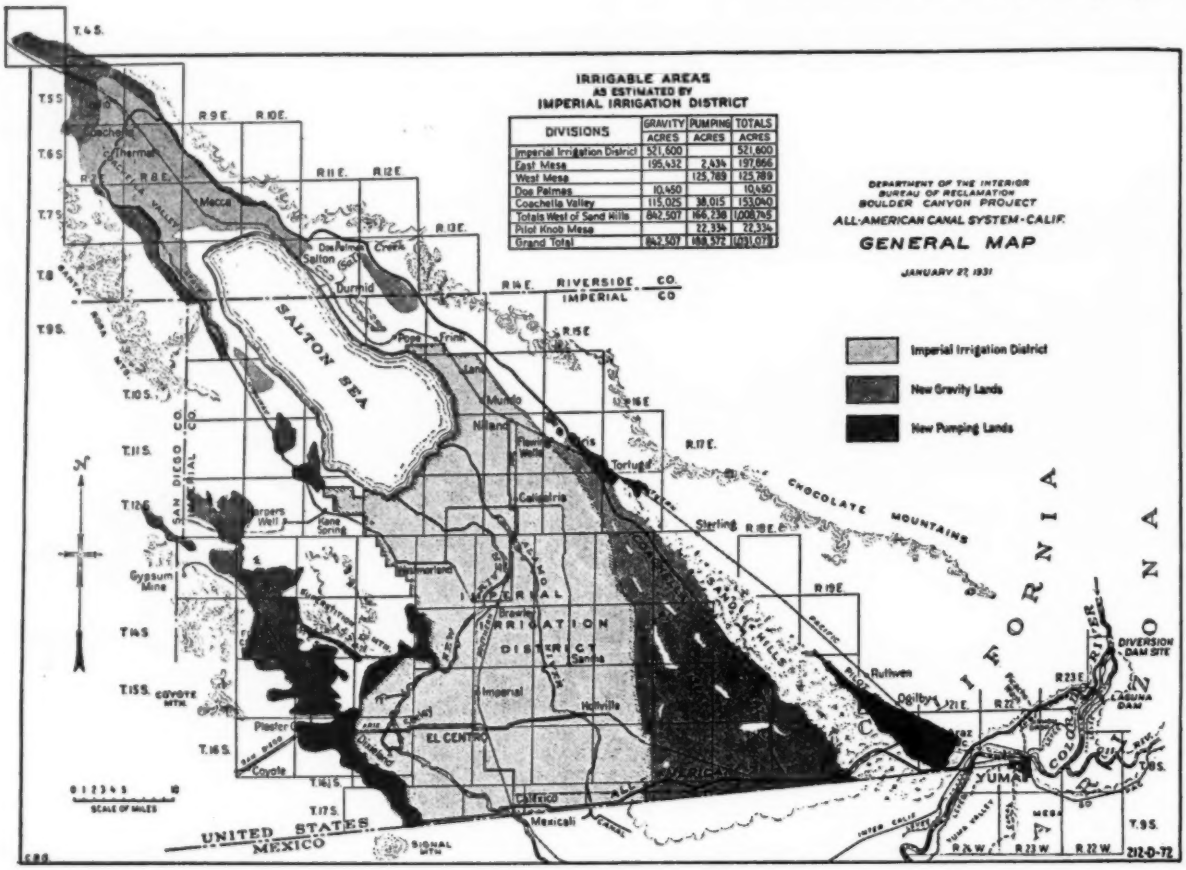
OVERSHADOWED somewhat by two nearby projects of greater magnitude —the $220,000,000 Colorado River Aqueduct and the $110,000,000 Boulder Dam—the construction of the $38,500,000 All-American Canal, now well under way, has as a result escaped much of the publicity given the other two.

While outranked in dollar value by the Colorado River Aqueduct and Boulder Dam, the All-American Canal can lay claim to an earlier origin, for it has a history dating back prior to the Civil War. In 1858 and '59 plans were worked out for the colonization and development of land in Southern California, under irrigation with water from the Colorado River. This project collapsed when the necessary bill to transfer Government land to California failed to pass Congress.

In 1876 a survey was made by U. S. Engineers, who reported unfavorably upon a canal route entirely within the United States, but suggested instead one which crossed Mexican Territory. After considering the geological features of the basin and deltas through which the lower Colorado River flows, the recommendations for the latter route as being the more natural and practicable one are well understood.

Imperial Valley Lies Below Sea Level

Ages ago, according to geologists, the Gulf of California extended far to the northwest of its present limits. The northern end of the Gulf is thought to have been located in the vicinity of Indio, Calfornia. Continuous deposition of silt which the Colorado River carries in enormous amounts eventually resulted in the building up of a low, flat delta across the ancient gulf, cutting off the northern portion from its connection with the ocean. The body of water which was then separated from the ocean by this ridge gradually dried up, leaving what is now known as the Salton Basin. At the present time, about 300 square miles of this basin are covered with water which is a remnant of a flood occurring in 1905 and 1906, at which time the


IRRIGABLE AREAS
AS ESTIMATED BY
IMPERIAL IRRIGATION DISTRICT
DIVISIONS | GRAVITY ACRES | PUMPING ACRES | TOTALS ACRES
Imperial Irrigation District | 521,600 | | 521,600
East Mesa | 195,432 | 2,434 | 197,866
West Mesa | | 125,789 | 125,789
Doe Palmas | 10,450 | | 10,450
Coachella Valley | 115,025 | 38,015 | 153,040
Totals West of Sand Hills | 842,507 | 166,238 | 1,008,745
Pilot Knob Mesa | | 22,334 | 22,334
Grand Total | 842,507 | 188,572 | 1,031,079
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
BOULDER CANYON PROJECT
ALL-AMERICAN CANAL SYSTEM-CALIF.
GENERAL MAP
JANUARY 27, 1931
Imperial Irrigation District
New Gravity Lands
New Pumping Lands
SALTON SEA
IMPERIAL IRRIGATION DISTRICT
CHOCOLATE MOUNTAINS
CALIFORNIA
UNITED STATES
MEXICO
YUMA
EL CENTRO
DIVERSION DAM SITE
LAGUNA DAM
SCALE OF MILES

discharge of the entire river was to the north instead of to the south along its natural course.

North from this delta ridge, which has an elevation of about 36 feet above sea level, the ground slopes downward until a depth of approximately 280 feet below sea level is reached at certain places in the bed of Salton Basin. The area immediately to the north of Salton Sea is known as the Coachella Valley, while to the south lies the Imperial Valley. The latter extends beyond the International Boundary Line into Lower California, a part of Mexico.

Early Attempts to Build Canal Failed

While the report made by army engineers in 1876 showed that the most practicable route for a canal fell in Mexican territory, active efforts were made by those interested in irrigation of the Imperial Valley to construct a canal which would be entirely within American territory. A company, organized in 1892, made surveys and plans to divert water from the river at a point very close to

● *Slightly over 1,000,000 acres of farm land will be irrigated by water from the Colorado River when the $38,500,000 All-American project is completed. This will more than double the present acreage now under irrigation in the Imperial Valley.*

● *"Watching the Fords go by" on the canal one sees some strange sights. Here Assistant Superintendent Thomas Townsend, Superintendent V. H. Gray and Engineer Bruce Gentry (left to right) are preparing a V-8 for a ride across the big ditch in the 12-yard bucket of one of the W. E. Callahan Construction Company's Bucyrus-Monighan draglines.*

● *Rough country is found where the canal passes through the sand dunes. Here W. E. Callahan Construction Company and Gunther & Shirley use a 12-yard and two 6-yard walking draglines.*

the International Boundary Line. Efforts were abandoned, however, when the company failed.

A few years later, another company succeeded in building a canal along the boundary line. The water flow from the river to the canal was controlled by a timber structure. Because of the accumulation of silt and recurring low water stages, however, it was impossible to maintain the required flow into the canal. The water shortages in 1903 and 1904 resulted in the irrigation organization applying to Mexico for a concession under which water could be diverted from the Colorado River, through a canal to be constructed on Mexican territory. The Mexican government granted this concession in 1904, and within a very short time water was flowing into the district through the Imperial Canal.

Since that date, Colorado River water had been supplied to the Imperial Valley which meanwhile has been increasing in area until the number of acres under irrigation now exceeds 500,000. This fertile district, with an annual rainfall of only three inches, is nationally known because of its year-round production of out-of-season fruit and vegetables.

The situation under which farmers of the Imperial Valley were dependent upon water derived from a canal owned and controlled by foreign interests was not a particularly pleasing one to them. As a result, agitation has been carried on for years for the construction of a canal entirely within the jurisdiction of the United States.

Construction of Canal Authorized

Proponents of the All-American Canal eventually brought their campaign to a successful conclusion when the construction of a canal was sanctioned by Congress under the Boulder Dam Project Act approved in December, 1928. This act authorized an expenditure of $165,000,000 for the construction of a dam and power plant in Black Canyon, on the Colorado River, and the All-American Canal. Approximately $109,000,000 of this sum was allocated to the dam and power plant and $38,500,000 to the Canal.

The Imperial Irrigation District entered into a contract with the Government in December, 1932, under which the district agreed to repay the Government over a period of 40 years without interest, the cost of the canal project. The Federal Emergency Administration of Public Works authorized an allotment of $27,000,000, and provided $6,000,000 with which to begin construction. This latter amount applied only to the diversion dam and main canal to the Imperial Valley, and did not include the Coachella Branch or future power developments.

Main Canal 80 Miles Long

Plans developed for the All-American Canal by Bureau of Reclamation enginers call for the diversion of water from the Colorado River, at a point about five miles upstream from the Laguna Dam, by means of a new dam. This diversion dam, of the "floating" or Indian weir type, with a crest 1700 feet long, will raise the river water level about 22 feet. Near the dam, six desilting basins will collect the silt carried by the Colorado River, and prevent it from entering the irrigation canal. By means of gates and sluice ways, the silt deposited in a basin can be washed back into the river below the dam. With Boulder Dam in operation, the quantity of silt carried by the river at this point is expected to be only a small percentage of what it formerly was.

The main canal to the Imperial Valley will be approximately 80 miles long, and the branch to the Coachella Valley 130 miles long. The section of the main canal between the diversion dam and the siphon drop, just north of Yuma, will have a capacity of 15,000 second feet. At this point, 2,000 second feet will be diverted to satisfy the irrigation requirements of the Yuma Valley, a

● *Above: 12 yards of dirt on the spoil pile! 24 hours a day, the big dragline swings back and forth with monotonous regularity.* ● *Top right: Griffith Company's Northwest shovel loads rock to one of their 25-yard LeTourneau buggies. A 12-yard Mack truck waits on the opposite side of the shovel.* ● *Center: These rolling sand hills are typical of much of the terrain through which the All-American Canal will pass. It will be a problem to keep the sand from blowing into the canal after it is completed. Several methods have been proposed and will be tried out in the near future.* ● *Below left: A close-up of the 10-ton hook as it rips its way through cemented gravel. In this illustration the dragline is working up on the berm of the canal.* ● *Below right: Here a hook is being used by a dragline working on the bottom of the canal section.*

United States Reclamation project located on both sides of the Colorado River, in Arizona and California. From the siphon drop to Pilot Knob, the main canal will have a capacity of 13,000 second feet. Here 3,000 second feet will be returned to the river. This diversion will be available for future power development. Westward from Pilot Knob, the canal will carry 10,000 second feet. The branch to the Coachella Valley will carry approximately 2,000 feet at the head and 1,000 second feet where it enters the valley. The general map of the All-American Canal System, on page 370, shows the route of the canal and its proximity to the International Boundary Line.

Construction Started in 1934

Initial steps in the construction of this gigantic ditch were taken late in 1933 when the Bureau of Reclamation received bids on approximately 21,000,000 yards of excavation. All bids at this letting were rejected. Later in 1934, the same work, with additional schedules bringing the total to 40,000,000 yards, was readvertised. When bids were opened June 7, 1934, the joint bid of W. E. Callahan Construction Company of St. Louis, and H. Gunther and J. P. Shirley of Omaha was found to be low on schedules 1 to 6 inclusive. These six schedules covered 39,340,000 yards of dirt on which the successful contractors bid 12¼ cents per yard, and 28,000 yards of rock at $1.25 per yard totaling approximately $4,860,000. Schedule 7, which involved 540,000 yards, mostly rock, went to the Griffith Company, Los Angeles, at a figure of 42 cents per yard for a total of $226,800.

● *A beautiful piece of work. This section of finished canal is 160 feet wide on the bottom and 40 feet deep.*

Actual construction got under way on August 7, 1934, when the Griffith Company took out the first dipper full of dirt near Pilot Knob. Meanwhile the Callahan organization was busy moving in a number of Bucyrus-Monighan draglines from the Mississippi River where they had been engaged in building levees. In addition, this organization sublet approximately 6,000,000 yards of excavation to Boyce & Igo of Baton Rouge, La. This latter company also brought in two Bucyrus-Monighan draglines, and started excavating in December, 1934.

Callahan and Gunther and Shirley's contract begins near Laguna Dam at Station 245 and extends 30 miles westward to Station 1860. The east section of the canal will be 22 feet deep and 160 feet wide at the bottom with a bank slope of two to one. This organization operates two Bucyrus-Monighan 10-W Diesel-powered draglines carrying 12-yard buckets on 165-foot booms, three 6-W draglines of the same make equipped with 6-yard buckets on 100-foot booms, one 2-yard Bucyrus-Erie dragline, and one 2-yard Northwest dragline.

Excavation is usually made to full depth. The banks are trimmed and sloped with the two-yard

● *W. E. Callahan Construction Company's 10-W Bucyrus-Monighan dragline carves out a section of the canal where it makes a bend. Tough digging here in gravel and rock. The two Ingersoll-Rand portable compressors in the right foreground supply air for a drilling crew nearby.*

● *Here's the way the big ditch looks from the operator's cab. This section has a bottom width of 160 feet.*

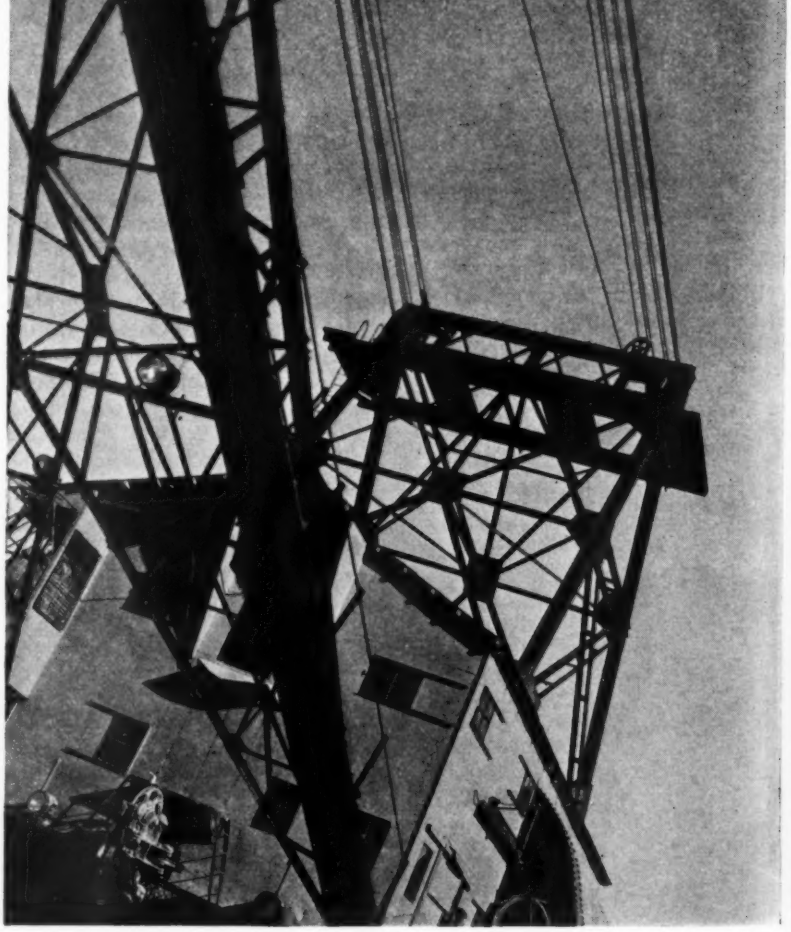
draglines. In places where deep washes are encountered, extensive fills are made with waste from the canal section. The long reach of the draglines with their 165-foot booms permits these machines to cast directly into the fills.

Ten-Ton Rooter Loosens Gravel

Although schedules 1 to 6 lay mainly in sand and silt formations, considerable cemented gravel and rock have been encountered. At first, blasting was resorted to in order to break up these patches. It was found, however, that the cemented gravel was difficult to drill. In addition, considerable delay for the dragline was inevitable when the machine encountered a patch of this material. At such times, a drilling and blasting crew had to be brought over to handle it. This difficulty has been eliminated by making use of a giant steel rooter, or "fishhook," as it is commonly called on the job. The huge hook, weighing over 10 tons, is carried along with the big dragline. When a hard patch of gravel is encountered, the bucket is merely detached from the hoist block and the fishhook substituted. The hook is handled in the same manner as a bucket, dropped point first into the gravel and pulled in by the drag rope. Several passes with the fishhook are sufficient to break up the gravel so that it can be handled by the bucket.

The two main members of the fishhook beam are 27 feet long, cut from 1¼-inch steel plates. These members extend through and form the 8-foot hook which penetrates the ground to a depth of six feet. The hook portion is

(*Continued on page 396*)



● *Characteristic features of these huge walking draglines are their wide and high A frames and the widespread base section of the boom. These give great stability to the machines and permit them to swing faster with their 12-yard loads, according to Bucyrus-Monighan engineers.*

Steam Shovel Discusses Re-employment

By SPENCER A. JONES

● *Stripping off the top soil in a hurry. Only one new ram washer was needed on the shovel in spite of a 4-year lay-off.*

I'LL SAY I'm glad to be back working again," said the ¾-yard Bucyrus-Erie Type B steam shovel which the photographer found digging beside a busy highway in Verona, New Jersey.

"How long were you out of work?" asked the photographer.

"Four years," was the answer.

"You must have been in bad shape when you started in again."

"Like heck I was! All I needed was one new ram washer, and what's more, I'll have you understand that I've moved more than two million yards of dirt and never had to have my engines overhauled. Excuse me a minute 'till I load this Mack truck."

"Whom are you making this hole for?" inquired the photographer.

"Louis Kramer is going to build a super gas station here and my bosses, J. R. & M. C. Fusco, Inc. of Montclair, New Jersey, got the excavating contract and asked me to do the job for them. It isn't a very big job; only about 15,000 yards, mostly rock, to take out in two months. Right now as you can see, I'm just stripping off the dirt, but pretty soon I'll be chewing on rock and that's what I like. This earth excavating stuff is just child's play for me."

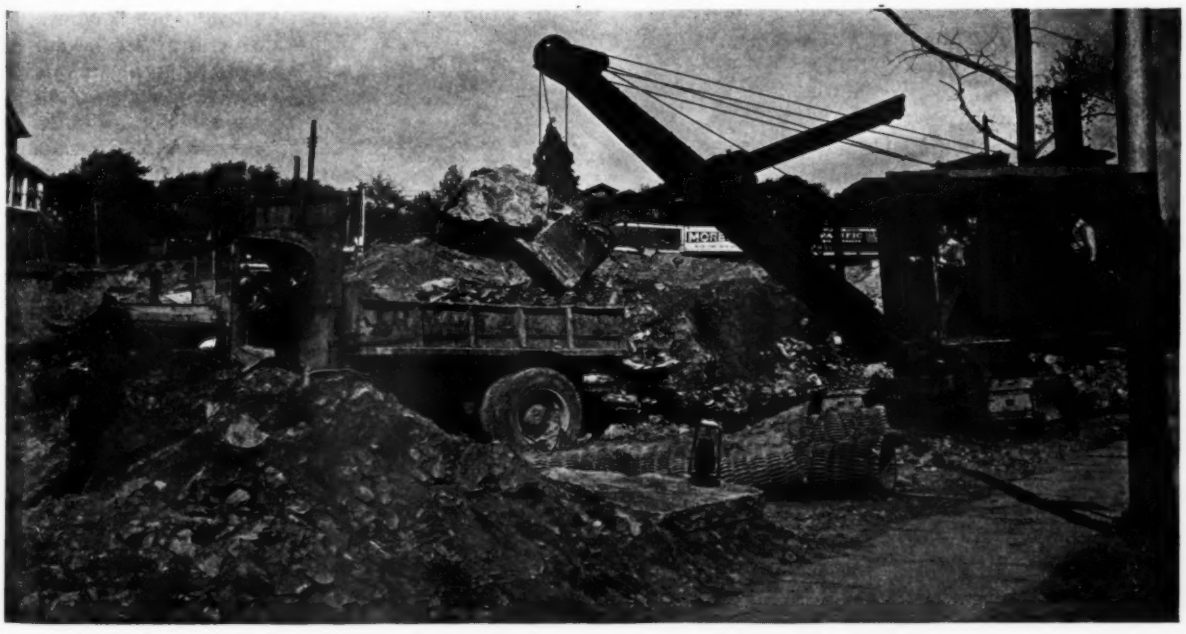
"Who are those two men helping you?"

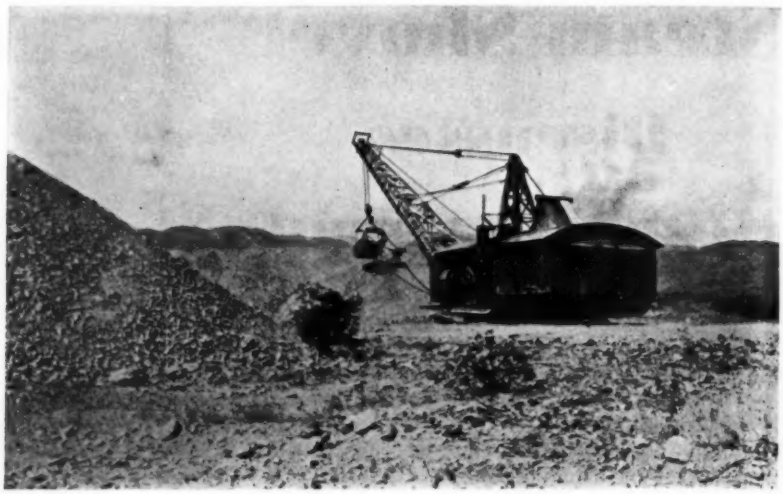
"Angelo Galasso is the operator and Frank Tenuto is the fireman. Wait a minute; here's a White truck to load. I may be ten years old but I never yet let a truck loaf on any job where I'm working. Right now I've got six trucks under me; two Macks and one White, owned by the Fusco brothers, and a Mack, an Autocar, and a Relay that Joe and Mike rented; all 5 or 5½-yard bodies."

"Do you mind if I take your picture?"

"Not a bit, but send me a print, will you? Set up your camera and when that Mack pulls in I'll give you the high sign. By the way, I wonder if you know that the Fusco brothers' business is fifty years old and was started by their father back in 1885. And here's one more thing, the boys have seven shovels and I'm the one they picked to do this job."

● *15,000 yards, mostly traprock, are to be removed for a new gasoline filling station. Located in a residential district, special precautions must be taken during blasting to prevent rocks from flying. Note the rolled-up, heavy blasting mat in the foreground.*





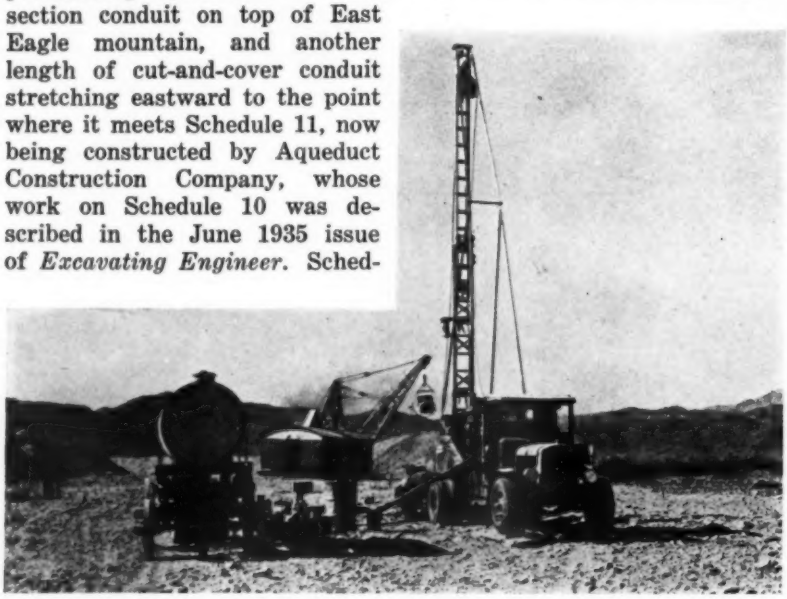
Hard Digging on the Aqueduct

Three Companies, Inc., excavates six-mile section through cemented gravel

By JOHN R. MARCY

SCHEDULE 12 of the open work on the Colorado River Aqueduct lies between Coxcomb and Eagle mountains. Here, Three Companies, Inc., is engaged in constructing an important link in this 242-mile Aqueduct. Schedule 12 is comprised of a short length of cut-and-cover conduit between the East and West Eagle mountain tunnels, approximately 2,000 feet of rock section conduit on top of East Eagle mountain, and another length of cut-and-cover conduit stretching eastward to the point where it meets Schedule 11, now being constructed by Aqueduct Construction Company, whose work on Schedule 10 was described in the June 1935 issue of *Excavating Engineer*. Schedule 12 is 33,400 feet in length and includes two siphons. The contract price is $1,313,000.

Three Companies, Inc., is made up of the New Mexico Construction Company, Denver; W. S. Broderick of the Western Paving and Construction Company, Denver; and D. G. Gordon of Los Angeles. Superintendent C. G. Clapp is in charge of the work, with Phil Shirley as Assistant Superintendent. Tom Rivers is excavation superintendent.



● *E. C. Ferguson's well drill keeps 100 yards or so ahead of the dragline. Water for drilling operations has to be hauled in tank wagons.*

● *Still going strong after 12 years of service. The gravelly nature of the digging encountered is apparent upon looking at the spoil bank to the left of the machine.*

The excavation of the rock section of the project has been sublet to Von der Hellen and Pierson of Castaic, California.

Blasting Necessary to Expedite Digging

One of the outstanding features of this job is the hard digging. A stratum of cemented gravel runs through the valley, and blasting is resorted to continually. Three Companies, Inc., engaged E. C. Ferguson, well-known Los Angeles driller, to handle the drilling and blasting. Mr. Ferguson brought in one of his Bucyrus-Armstrong well drills and is sinking a line of holes 21 to 24 feet deep, and 26 feet apart, along the center line of the canal section, and ahead of a Bucyrus-Monighan 4-yard dragline. This depth carries the holes approximately to grade. Each hole is sprung with from 6 to 7 sticks of 40% gelatin dynamite; then 12 cans (300 pounds) of Hercules black powder are used. This quantity of powder loads the hole up 2½ to 3 feet above bottom. Electric caps are used for firing.

The rig, used by Driller Ferguson, is one of four Bucyrus-

Armstrong drills which he owns. Actually, the rig might well be called an all-purpose drill; it has been used for wells, prospecting, air shafts for mines, and blast holes. On this Aqueduct job, it works three shifts of 8 hours each, and is keeping well ahead of the dragline, which also operates 24 hours a day.

Well Drill Averages Two Holes per 8-Hour Shift

The drill is equipped with a 33-foot mast and is using 6-inch bits 5 feet long with a 20-foot stem. This drill is a Model 33 mounted on a truck, while Ferguson's other three rigs are all older Model 45's, mounted on trailers. Driller Ferguson says that he likes the Model 33 the best, not only because it is the newest, but also because it is the handiest and most portable one of the four.

● *This view of the canal section, excavated to grade, shows the hard digging encountered. Note the nearly vertical walls through the compacted gravel.*

● *Shown here are Punch and Judy, claimed to be the only working mule team on the Aqueduct. The team pulls a fresno, following up a Caterpillar 60 tractor equipped with a LeTourneau bulldozer, and brings the bottom of the cut to grade. This photograph shown through the courtesy of Aqueduct News.*

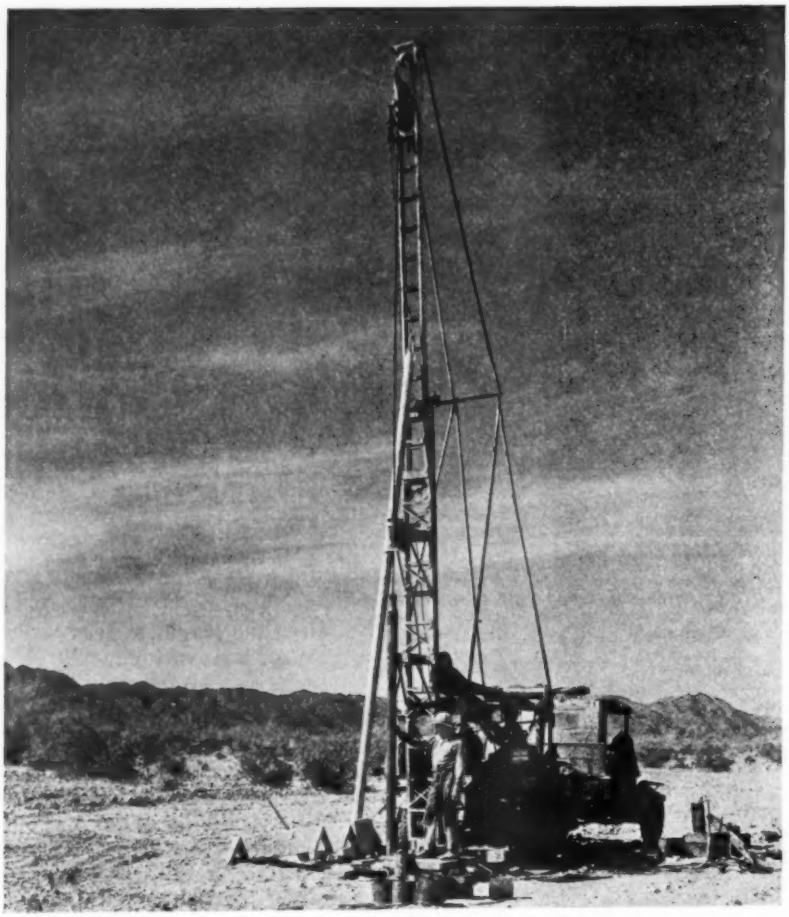
An average over the two months period the drill has been working in the cemented gravel shows a little better than two holes per shift, and some of the shifts have reached three holes. Actually, the drill will go down 6 feet per hour, but frequent moves and set-ups bring down its average. A 4-foot piece of starter casing is used, and the first half of the hole is run without cleaning. On the last half it is necessary to bail out three or four times. One thing that does not bother the drill operators is bit sharpening. Clean holes are not necessary for this type of work, and one bit will drill four of them, or nearly 90 feet of hole.

Dragline Handles Heavy Excavation

Moving steadily along a hundred yards or so in back of the drilling crew is the Bucyrus-Monighan Diesel-powered dragline equipped with a 4-yard bucket. Since the blast holes are put down only on the center line of the ditch to avoid disturbing the sides, the Monighan has mighty hard digging along the edges. During the month of March some 80,000 cubic yards were all that were moved by the machine. This is not a bad record, however, because away from the center the cemented gravel assumes almost the texture of solid rock.

This particular dragline has seen lots of service and has traveled long distances, for last year it was hard at work on the Madden Dam project in Panama, at which time it was owned by W. E. Callahan and Peterson, Shirley,

● *Desert Centre is well named. Although 11 miles away it is the nearest "city" to Three Companies' job.*



● *A row of blast holes is put down along the center line of the canal section, ahead of the dragline. This truck-mounted Model 33 Bucyrus-Armstrong well drill will average slightly better than two 21- to 24-foot holes per 8-hour shift.*

and Gunther, contractors on that project. It finished there late in November, 1934 and was moved up to this job to start on January 8, 1935.

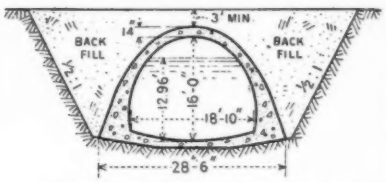
The dragline works 24 hours a day, 6 days a week. Four runners are required: Ernest Wallace, M. J. Havens, Paul Barnes, and Earl Claudell. The machine is powered by a two-cylinder 120-hp Fairbanks-Morse Diesel engine, and is well into its twelfth year of service.

Finish grading behind the Bucyrus-Monighan dragline is being done by a LeTourneau bulldozer and a Caterpillar 60, followed by a team of mules pulling a 4-foot fresno. Another Caterpillar 60 and an Atlas tumble-bug are also used part of the time. The surplus material is lifted out of the ditch by a 2-yard Northwest dragline. Of the 31,700 feet of conduit, some 12,000 feet had been completed by the end of May.

● *The dragline pauses for a few minutes to take on a fresh load of fuel. Fuel is hauled to the dragline in a tank mounted on a Ford truck.*

Air Used at Screening Plant to Remove Fines

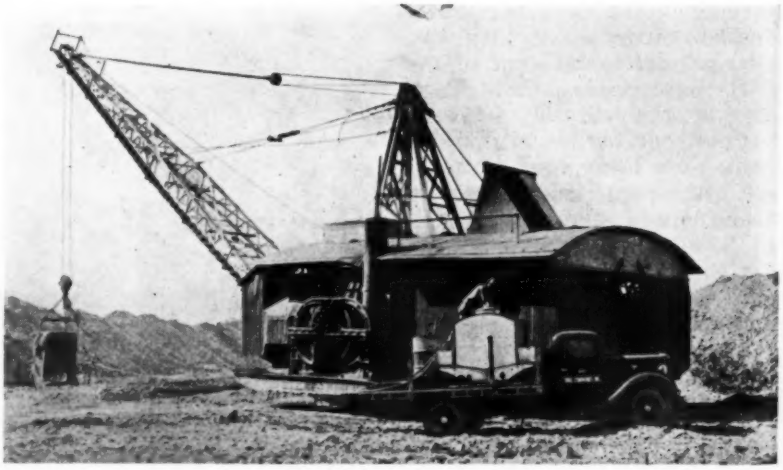
At the gravel plant, located at the foot of Eagle Mountain, a Koehring 1-yard shovel loads to two 10-ton Mack trucks which haul to the grizzly. The grizzly discharges the material onto a 30-inch belt with shaker feeder, through scalping screens, and through a 15x38 Wheeling jaw crusher that takes up to 6-inch rock. Then the material is either stock-piled or taken to the top of the aggregate plant. There, a special 20-foot horizontal Simmons screen, the longest made, separates the material into four sizes,

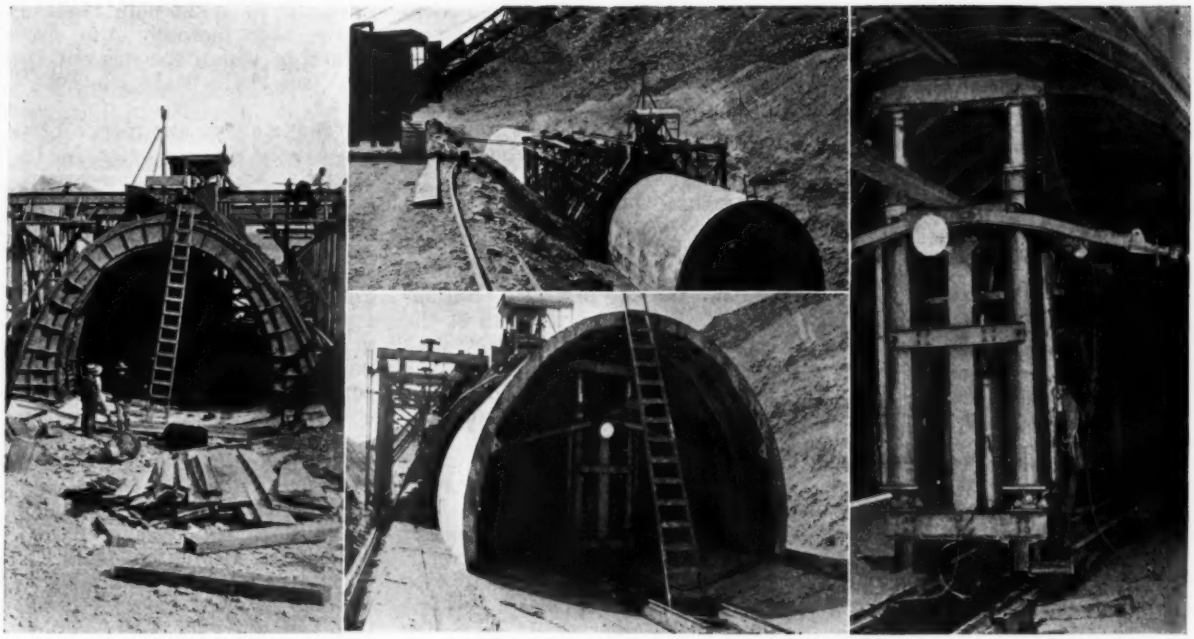


● *This drawing shows a typical cross section of a cut and cover conduit. The top of the conduit must be three feet or more underground.*

1½" to 3", ¾" to 1½", pea gravel and sand. There is also an air blower on top of the aggregate plant for taking out fines. The plant has a storage capacity of 250 tons of aggregate, in addition to which, the stock piles can be drawn on when necessary.

Cement is hauled to the Three Companies' job by the Santa Fe railroad, being brought to the hoppers at the batching plant by truck from Mecca, the nearest railroad point, a distance of 45





● *Left: The inside and outside forms for the arch are ready to receive concrete. Approximately 190 yards of concrete are required for 70 lineal feet of arch. Top center: The inside arch is built in 7-foot sections totaling 140 feet in length. Bottom center: The inside arch is in the process of being moved ahead in preparation for another pour. Right: Moving the inside arch form is aided by dual hydraulic hoists. These raise the form into position for pouring and lower it for moving ahead.*

● *The Diesel-powered dragline finds the digging somewhat easier along the center line of the canal section where the cemented gravel has been broken up by blasting. The digging is much harder along the edges of the section where the gravel has not been disturbed.*

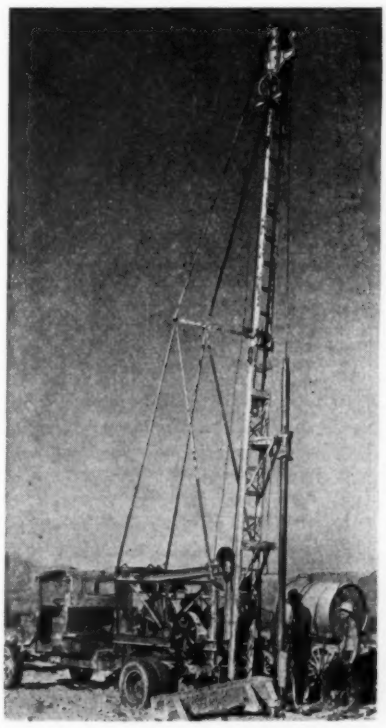
miles. From the hoppers, it is conveyed by screw conveyors and a bucket elevator to the 1500-barrel silo or to the batching plant.

Here, at the plant, Garlinghouse automatic batchers, equipped with electric scales, control the weighing of each kind of material. The scales work a solenoid arrangement, controlling radial gates which drop approximately 85% of the material, then a rotary gate dribbles the balance until the desired weight is reached, cutting off the feed automatically. Six Ford dump trucks, each carrying two one-yard batches, haul to the Ransome dual-drum Model 27 E paver mixer, equipped with a 50-foot boom. All of the paving equipment and the forms were manufactured by Ransome Company.

Concreting Progresses Rapidly

The invert and arch of the cut-and-cover conduit are poured separately. On the invert, a slip form and pouring gantry which moves along about 35 feet per hour is used with both internal and external vibration. On the arch, a master form, equipped with a gasoline - powered hopper car, places concrete at the rate of 60 cubic yards per hour. The concrete in the arch is also vibrated, workmen using tubes with rotating, internal-counterweighted shafts. After forms are removed, two coats of Hunt asphalt-base processing dope and one coat of whitewash are placed on the outside of the arch. Water for cur-

(Continued on page 402)



● *Driller Ferguson says he likes his model 33 Bucyrus-Armstrong drill because of its snappy drilling action and its ready portability which enables him to pick up jobs over a wide territory.*

EXCAVATING ENGINEER

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The Business Situation

IN GENERAL business, the two developments which give us cause for optimism at the present moment are rising prices on the stock market and the increasing sale of automobiles. Both are probably indications of increasing optimism among the persons living in the United States. Rising prices on the stock market, however, may indicate fear of inflation just as much as optimism concerning the condition of business in the future. It is impossible to decide which of the two influences is major in the present upturn, but whichever it is, the result is probably a good sign rather than a bad one. The activity in the automobile industry appears to be the result of two things. First, the unusual strides that industry has made in the last few years in its endeavor to offer the public unusually good values at very reasonable prices. Second, an increasing optimism among the people of the United States which results in their being willing to commit themselves for deferred payments.

In the construction industry, the two most favorable developments of recent weeks are the rulings in regard to the "$1400 clause" and the practical elimination of that clause from all of the larger projects to be undertaken in the immediate future by the Federal Government. The other promising development is the increase in the building of residences. The volume has not yet reached proportions which warrant much enthusiasm, but there has been a decided improvement and, if it is indicative of the willingness of people with excess funds to invest them in durable goods, it is a decidedly favorable factor.

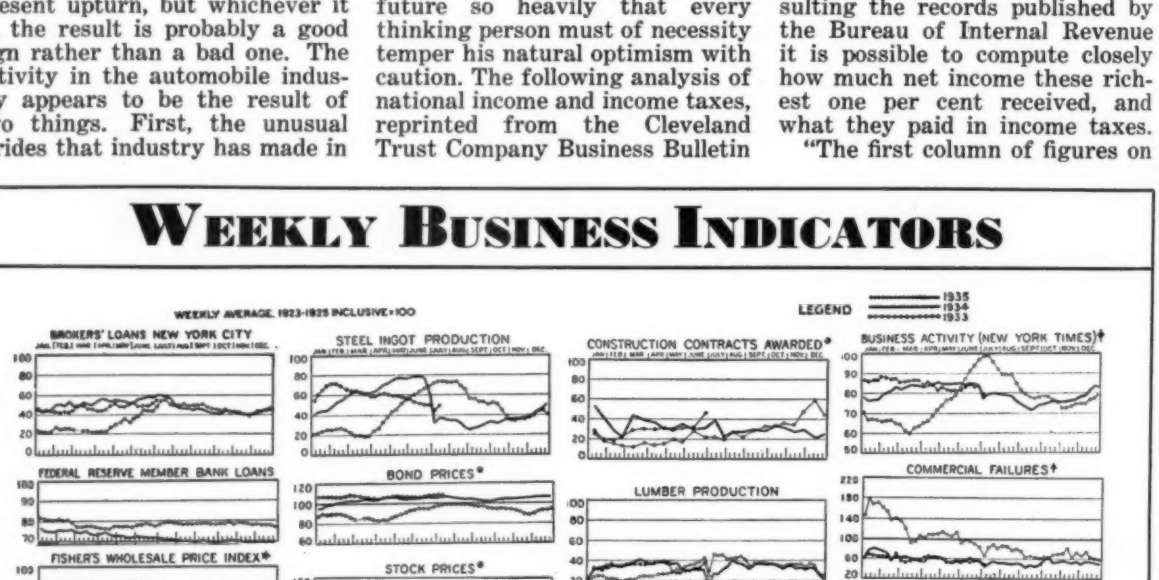
The most active factor in retarding business improvement . . . probably the one factor that is holding up a rapid improvement in business conditions . . . is the experimental legislation being enacted in Washington and the attendant, continued, excessive expenditures which mortgage the future so heavily that every thinking person must of necessity temper his natural optimism with caution. The following analysis of national income and income taxes, reprinted from the Cleveland Trust Company Business Bulletin for July 15, 1935 points out directly and factually the gross errors on which the present "social insecurity" legislation is based.

"The richest one per cent of those receiving incomes in this country appear to have received in 1932 about 10 per cent of the total national income, and in 1928 over 17 per cent. For the 18 years from 1916 through 1933 the richest one per cent appear to have received about 12 per cent of the national income. In the accompanying diagram, the 18 horizontal bars represent in billions the national income paid out for the years from 1916 through 1933. The part of each bar at the right hand end that is separately marked off represents the income received by the richest one per cent of the income receivers. The figures within the bars represent the amounts of income received in billions of dollars.

"The diagram is based on the assumption that 40 per cent of the population are income receivers in the sense that the Census enumerates them as being in normal times engaged in gainful occupations. Then one per cent of this 40 per cent makes up each year the richest one per cent of the income receivers, and by consulting the records published by the Bureau of Internal Revenue it is possible to compute closely how much net income these richest one per cent received, and what they paid in income taxes.

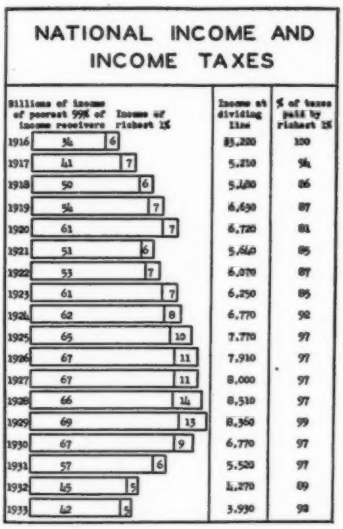
"The first column of figures on

WEEKLY BUSINESS INDICATORS



the right hand side of the diagram shows the average annual incomes of those people who were at the dividing line between the poorest 99 per cent and the richest one per cent. These dividing line incomes vary widely in different years. In 1916 the people getting more than $3,220 were among the richest one per cent. In 1928 the dividing line had moved up so that income receivers had to get more than $8,510 during a year to be among the richest one per cent. By 1933 it had dropped again to $3,930.

"The second column of figures at the right hand side of the diagram shows for each year the percentages of all the income taxes that were paid by the people receiving such high incomes that they were among the richest one per cent. These figures vary between 100 per cent and 85 per cent. For the whole period the richest one per cent paid about 92 per cent of all the income taxes. On the average these individuals paid over 1,000 times as much per person as did those making up the poorest ninety-nine per cent.



"The new taxation proposals now under consideration contemplate considerable increases in the taxation of the richest one per cent, and possibly some extensions of taxation among the 99 per cent receiving the smaller incomes. The possibilities for increasing Federal revenues through heavier taxation of the wealthy are smaller than one might suppose from noting the large total incomes of the richest classes. If the government had taken in 1933 the entire incomes of the richest one per cent in excess of $3,930 per person, the additional amount taken would have paid hardly more than half the Federal deficit of that year, or if it had distributed that excess among the remaining 99 per cent of the income receivers each one of them would have had his monthly income increased by less than five dollars a month."

Old Times and Old Timers

Side-Lights on Shovel Runners

OLD TIMER Fred F. Nichols in Los Angeles, California, writes a letter full of interesting side-lights on early shovels and shovel operations back in 1896.

"Our Father, Geo. H. Nichols, being an old time shovel runner, naturally we boys were interested in shovels. We made one out of a soap box, and put it in our cellar: together with a pile of nice, soft dirt. The boom (then called the crane) was of the split type. The dipper handle ran on spools; and the dipper was made from a tin can. My older brother was the engineer, and I the craneman. My other brother was too young to be a fireman, so we made one of our sisters act as fireman. Then we would move dirt all winter.

"Several years later, when I was nine, I rode past the Edgar Thompson Steel Mills at Braddock, Pa., and saw a Bucyrus shovel digging slag. I didn't pay so much attention to the machine as to the steam shooting out of the top end of the boom. I couldn't imagine why that steam was coming out of that boom and making such an awful racket (exhaust from crowd engine). So naturally at the supper table that night, the conversation was 90% about shovels. I horned in, saying, 'Gee, I saw the funniest shovel today, Dad. It looked like a Bucyrus, but this one had steam shooting straight up in the air out of the end of the crane.' Dad replied, 'Yes, it was a Bucyrus with steam engines on the crane—a new wrinkle that has been invented over the old friction crane.'

"Later, I used to get together with the then Old Timers and listen to them argue about the different makes of machines. Bucyrus always was the favorite with most of them. I, myself, was made on a Marion machine, but as time passed on, I also clicked on the Bucyrus. The slogan then was, 'Where you find hard digging, you'll always find a Bucyrus in it.'

"The shovel men, dinkeyrunners, and foremen nearly always had a certain barroom or hotel where they got together, and boy, how those shovel men would load cars of rock—dinkeyskinners running their old-style Porters with the steam dome in the cab—powder men putting off big shots, pot shots, and mud caps. The foremen were not so dangerous, but I did notice that they had quite a time keeping from being run over by a dinkey train, or getting hit on the noodle by a flying end of a broken hoist chain, or from getting shot up by a powder man. The barman would say, 'By golly, if these fellers load as much rock, and make as good time with them dinkeys, and shoot down a whole mountain to finish the job, without further use of the shovel and dinkeys, I certainly would like to be a contractor.' I never saw so much rock and dirt shot, dug, hauled, and dumped in such a small amount of space as a barroom. The barman says, 'We'll have to have bigger quarters to handle all the digging and dumping, and be gorry, it will have to be built of asbestos, because some shovel stiff that digs hot slag will load up a train and that dinkeyskinner over there will make a mile a minute to the dump, and that dump man over there will dump it before the train stops, and set the damn place on fire.'

"All this used to take place on Water Street, just around the corner east of Smithfield Street, in Pittsburgh, Pa. Men off the Wabash job, Squirrel Hill job, and numerous other jobs from all over the country came there."

It's interesting to read about the activities of shovel men after working hours. We see that they "talked shop" most of the time. Thanks, Mr. Nichols.

Field Notes

Emergency Jack Block

OCCASIONALLY, in the field, one has use for a jack and can find no planking handy which is heavy enough to safely support the jack and its load. The use of a board or piece of dry lumber is unsafe as it is quite liable to split. I have found that a satisfactory

and substantial block can easily be made from old orange crates, or crates of a similar nature. Remove the thin side strips, leaving the ends and the center piece. Place these three pieces together so that the grain crosses and then nail them securely together making use of the small crate nails. By crossing the grain, the block will have less tendency to split under load. Nailing these three pieces together will give a base block well over two inches thick and just the right size, about 12x12 inches, which will take and spread all the weight a small jack is usually required to handle.

— *Frank Bentley*

Highway Maintenance Costs Reduced

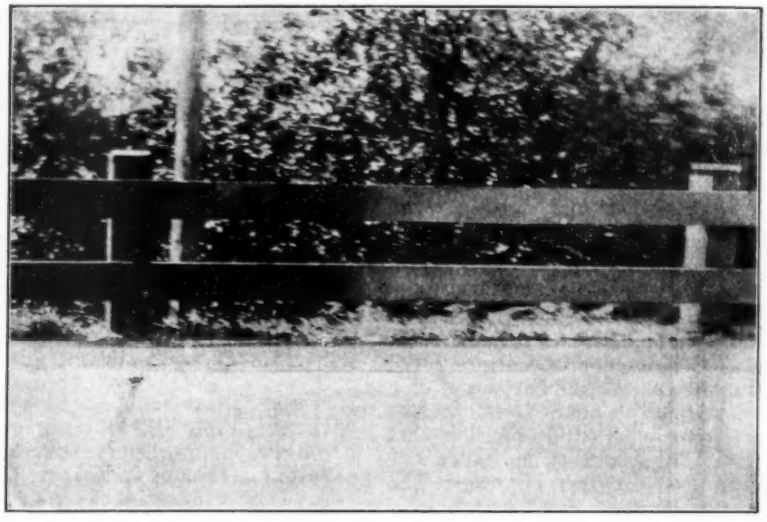
THE NECESSITY of maintaining highway guard-rails, bridges, abutments and the center lines of roadways in a bright, well painted condition in the interest of safety represents one of the major items of state highway maintenance expense.

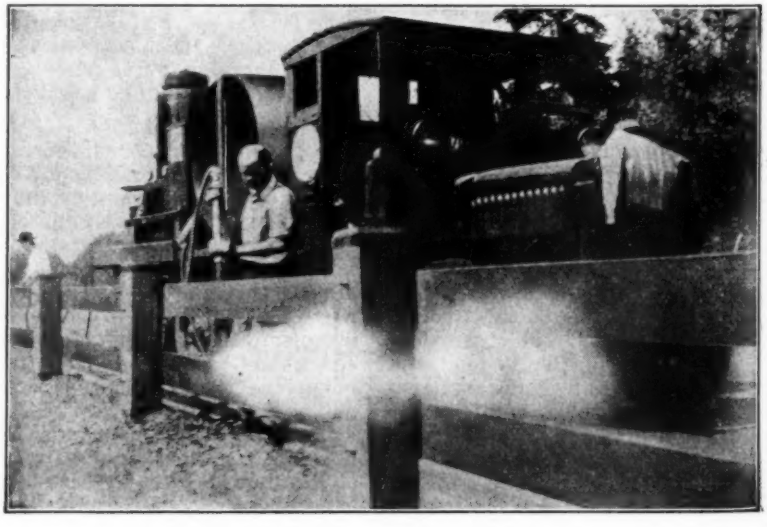
The Washington State Highway Department has produced some interesting savings figures in its effort to reduce materially maintenance costs on these safety devices. In this State, painting costs of highway guard rails alone, including labor, brushes and material, amounts to 5½ cents per foot. Due to traffic dust and dirt so quickly obscuring the painted surface of guard rails, it was decided to do some experimental work with various methods of cleaning in order to reclaim the safety value of these rails for night driving.

This experimental work resulted in the adoption of the vapor spray method of cleaning as produced by Hypressure Jenny, manufactured by Homestead Valve Manufacturing Company, Coraopolis, Pennsylvania. The cost of cleaning by this method, including a depreciation reserve which will allow purchase of new equipment every five years, water, cleaning compounds and labor, amounts to 1-2/5 cents per foot. A close check shows that at least one of every two painting operations may be saved through this method of cleaning.

The upper illustration shows a section of guard rail cleaned by this method and the lower illustration shows the cleaning operation in progress. The equipment, consisting of a Hypressure Jenny cleaner, 600-barrel water tank, and cleaning compound barrels, is mounted on a highway department truck. Two outlet vapor lines are piped from the cleaner; one extending to the front of the truck; the other to the rear. To each of these lines is attached a 25-foot length of hose with a

(*Continued on page 403*)

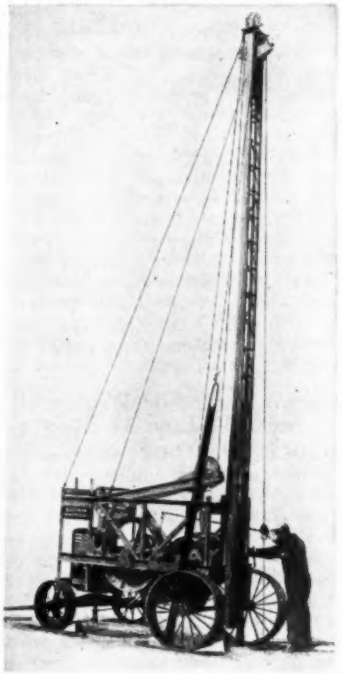




EQUIPMENT
You Ought to Know About

Low Cost Churn Drill

JUST ANNOUNCED by Bucyrus-Erie Company, South Milwaukee, Wisconsin, is the new Bucyrus-Armstrong 21-W churn-type drill. For holes to 300 feet in depth and to six inches in diameter, this drill makes available the speedy and effective drilling action of its famous companion



machines, the Bucyrus-Armstrong 26 blast hole and the 26-P prospecting drills—but at a materially lower price.

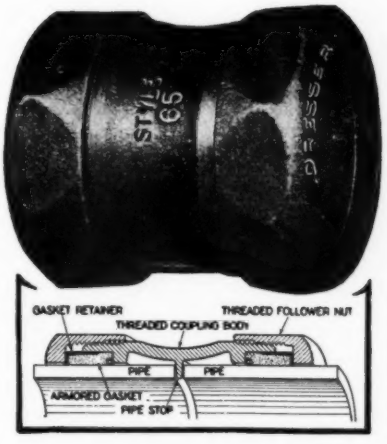
The 21-W is a sturdy, modern drill, of welded, all-steel construction, capable of handling a thousand pounds of tools. It is equipped with the exclusive Bucyrus-Armstrong rubber shock absorber—which makes practical the effective use of wire line. Ample power is furnished by a heavy duty, 4-cylinder industrial gasoline engine. A one-man drill, the 21-W is simple in construction, easy to set up, and easy to operate. It requires little adjustment and very little maintenance.

Clay and shale formation and some small rock projects can be drilled for blasting with the 21-W at exceptionally low cost. Test holes, mine ventilation and drainage holes can be drilled rapidly in any formation encountered on land or submarine operations. The 21-W may be mounted on a drill boat by simply removing the wheel mounting, and then setting the machine on two skids. It is appropriate for use in small quarries and mines, and on construction, coal stripping, and prospecting operations. For heavy drilling in large quarries or mines, the crawler-mounted Bucyrus-Armstrong 26 or 29-T electric blast hole drills are recommended by Bucyrus-Erie, but the considerably lower price of the 21-W makes it a very desirable machine in lighter drilling and where holes of six inches or less in diameter give satisfactory results. It will equal the speed of the larger drills mentioned on small hole work.

Choice of mounting is available: on a truck; as a two-wheel or four-wheel trailer; or for team or tractor haul. A copy of the new 21-W bulletin may be secured by writing Bucyrus-Erie Company, South Milwaukee, Wis.

Improved Pipe Coupling

THE NEW, self-contained pipe coupling, just announced by the S. R. Dresser Manufacturing Company, Bradford, Pennsylvania, is reported to require nothing more than the pipe (plain end) and an ordinary wrench to make a connection. Making the joint involves simply inserting the pipe ends into the coupling (which comes assembled) and tightening two threaded octagonal nuts.



As the nuts are tightened, two resilient armored gaskets are compressed tightly around the pipe ends. The manufacturer states that the resulting joint is not only permanently tight, but it also absorbs normal vibration, expansion and contraction movements, and permits deflections of the pipe in the joint.

This new coupling is applicable to both inside and outside piping, on gas, water, oil, air, chemical and industrial lines under high and low pressures. It is supplied in standard steel pipe sizes from ⅜″ to 2″ I. D. inclusive.

Complete information regarding the equipment mentioned on these pages may be had by writing the manufacturers. We will appreciate your mentioning EXCAVATING ENGINEER.

Two-Stage Stationary Compressors

SCHRAMM, Inc., West Chester, Pa., now offer their two-stage stationary compressors in five sizes for belt and motor drive. The manufacturer states these compressors are similar in design and operating features to their two-stage portable compressors. They consist of low pressure and high pressure cylinders, cast in one block. Air passing between stages enters a cross-flow type intercooler which reduces temperature almost to atmospheric. This intercooler also effectively serves as a filter, so that much cleaner air—free from vapors and heat enters the air receiver. The Schramm detachable compressor block is embodied in the two-stage compressor, facilitating easy adjustments, inspections and repairs with the minimum amount of time and expense.

Improved Bucket Loader

AN ENTIRELY new bucket loader has just been announced by the Barber-Greene Company, Aurora, Illinois. This loader, Model 82, which is reported by the manufacturer to be the greatest advancement in loader history, has many new and exclusive features embodied in its design. Among these are: the tank-type chassis frame, which eliminates the former complicated channel frame and cross bracings, and completely houses the driving

(Continued on page 392)

SHOTS *from the Firing Line*

Gas Tax Income Increases

STATE TAXES on gasoline reached a new high total of $565,027,000 in 1934, and, added to Federal gasoline taxes of $170,109,000, increased the cost of motor fuel by a grand total of $735,136,000. Reports of 1934 state gasoline tax collections, received from the U. S. Bureau of Public Roads, indicate that receipts from this source were roundly $47,000,000 higher than the $518,196,000 collected in 1933, and approximately $30,000,000 higher than the previous peak income of $536,397,000 collected in 1931.

New York State again collected the largest amount, $43,927,000; Ohio was second with $37,618,000; California was third with $35,960,000; and Pennsylvania was fourth with $33,409,000.

Taxes were paid upon 15,454,481,000 gallons of gasoline in 1934 as compared with 14,224,321,270 in 1933, indicating not only an increase in consumption but also improved enforcement of gasoline tax laws. Refunds, representing exemption from taxation for gasoline used for purposes other than propelling motor vehicles on highways, amounted to $26,968,000, with no comparable figure for 1933 available.

Bids on Sun River Project to be Received August 5

THE BUREAU of Reclamation will receive bids at its Fairfield, Montana, office, August 5th for the construction of the Pishkun Canal and the Sun River Slope Canal. The work, located near Fairfield and Augusta, Montana, involves 1,019,000 yards of all classes of excavation, and must be completed within 240 calendar days.

Bids for Relocation of the B & O Railroad to be Opened August 19

THE U. S. ENGINEERS, Pittsburgh, Pennsylvania, will receive bids August 19 for all construction work in connection with the relocation of the Baltimore and Ohio Railroad in the Tygart River Reservoir, near Grafton, West Virginia. This project, 12.2 miles long, is in two sections and covers all concrete work, all grading excavation, railroad tracks, tunnels, bridges, water stations, and other incidentals necessary to complete the job. Section 1 contains 913,700 yards, and Section 2, 986,300 yards of unclassified excavation. The relocation project is to be completed within 480 calendar days.

Plans and specifications are available at the following offices, in addition to the Pittsburgh office: Cincinnati, Ohio; Huntington, West Virginia; Louisville, Kentucky; St. Louis, Missouri; Nashville, Tennessee; New York City; Rock Island, Illinois; Chicago; St. Paul, Minnesota; Buffalo, New York; Philadelphia, Pennsylvania; Portland, Oregon; San Francisco, and Los Angeles.

Several Mississippi Dam and Lock Lettings Scheduled for August

CONSIDERABLE construction activity on the Upper Mississippi River is predicted as several dams and locks are being advertised for bids to be opened this month. In addition to Lock No. 13, near Clinton, Iowa, and Lock No. 17, near New Boston, Illinois, for which bids were received last month, the list includes:

Lock No. 14—Bids will be taken August 3 at the U. S. Engineer's Office, Rock Island, Illinois, for the construction of Lock No. 14 near LeClaire, Iowa, about 11 miles upstream from Rock Island, Illinois. The lock will be 600 feet long by 110 feet wide, with an upper guide wall 517 feet long, and lower guide wall of 500 feet. The principal items of work include: 78,500 yards of rock excavation; 31,500 square feet of rock channeling; 103,800 yards of fill; 62,000 yards of concrete; and necessary structural and reinforcing steel. This work must be completed within 480 calendar days.

Dam No. 18—Bids will be received August 14 at the U. S. Engineer's Office, Rock Island, Ill., for the construction of Dam No. 18 near Burlington, Iowa. The principal items of work are: 115,000 yards of common excavation; 40,000 yards of top soil excavation; 225,000 yards of dike embankment; 32,000 yards of riprap; 26,500 yards of embankment gravel; and 65,950 yards of concrete together with 2,850 tons of structural steel and 1,250 tons of reinforcing steel. The work is to be completed within 720 calendar days.

Dam No. 7—Bids will be received August 8 at the U. S. Engineer's office, St. Paul, Minnesota, for the construction of Dam No. 7 located about four and one-half miles above LaCrosse, Wisconsin. The principal items of work are: 50,000 yards of common excavation; 364,000 yards of dredged excavation; and 40,000 yards of concrete with approximately 1,750 tons of structural steel and 650 tons of reinforcing steel.

Dam No. 8—Bids will be received August 20 at the U. S. Engineer's office, St. Paul, Minnesota, for the construction of Dam No. 8 at Genoa, Wisconsin. The principal items of work are: 67,000 yards of common excavation; 365,000 yards of dredged excavation; 31,000 yards of dike embankment; 48,000 yards of concrete; with 1,690 tons of structural steel and 560 tons of reinforcing steel.

The plans and specifications for the construction of these projects will be available, in addition to the two offices named above, at the U. S. Engineer's offices in St. Louis, Chicago, Pittsburgh, Washington, D. C., and New York.

● Largest List of Used Equipment appearing in any Trade Paper in the Field

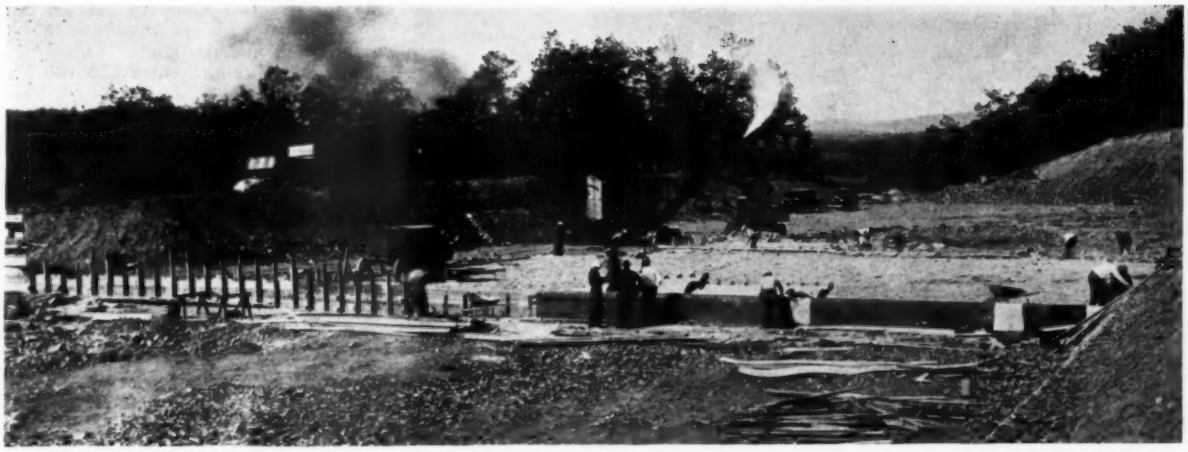
For Used Equipment
see
Excavating Engineer
For Sale and Bargain Counter Section
(Pages 400-401 and 404-407)

Progress on Public Works Highways to June 30, 1935

PROGRESS MADE on emergency construction of public works highways to June 30 under the supervision of the U. S. Bureau of Public Roads shows a total of 347 projects, estimated to cost $13,876,000, approved but contracts not yet awarded; 486 projects, estimated to cost $13,951,000, awarded but not yet under construction; 3,338 projects, estimated to cost $185,044,000, under construction; and 9,081 projects completed at a cost of approximately $397,362,000. The 3,338 projects under construction involve 8,530 miles of road and are giving regular direct employment to 136,029 men.

Seminoe Dam Bids Opened July 22

A BID OF $2,194,000, submitted jointly by Winston Brothers Company, Minneapolis, the Utah Construction Company, Ogden, W. A. Bechtel Company, San Francisco, Morrison-Knudsen Company, Boise, Idaho, and Henry J. Kaiser Company, Oakland, California, was low, July 22, for the construction of the Seminoe dam and power plant, the largest single unit of the Casper-Alcova Project in Wyoming now being developed by the Bureau of Reclamation. The principal items of work are: 541,500 yards of open cut excavation; 22,000 yards of tunnel excavation; placing 190,000 yards of concrete and 1,275 tons of reinforcing bars and steel. The Government will furnish materials such as cement and steel.



William Mulholland

WILLIAM Mulholland, 79, builder of the Owens Valley Aqueduct and nationally known hydraulic engineer, died July 22 after an extended illness.

Born in Ireland, Mr. Mulholland came to United States in 1872. In 1878, he settled in Los Angeles, then a city of approximately 10,000, where he found employment with the city water company as a ditch tender. He devoted his spare time to the reading of books on mathematics, civil engineering, and hydraulics. Successive promotions with the water company resulted in his being made general superintendent in 1886. The City of Los Angeles, in 1902, organized its own municipal water supply system and appointed Mr. Mulholland chief engineer.

His greatest engineering feat was the construction of the $24,500,000 Owens Valley Aqueduct which brings water 250 miles to Los Angeles from a lake in the high Sierra Mountains.

He was one of the pioneer backers of Boulder Dam, and did much of the preliminary work for the $225,000,000 aqueduct of the Metropolitan Water District, now under construction.

He is survived by his five children, Rose, Perry and Thomas of Los Angeles, Mrs. Lucille Mack of San Francisco, and Mrs. Ruth Wood of New York City.

New York Notes

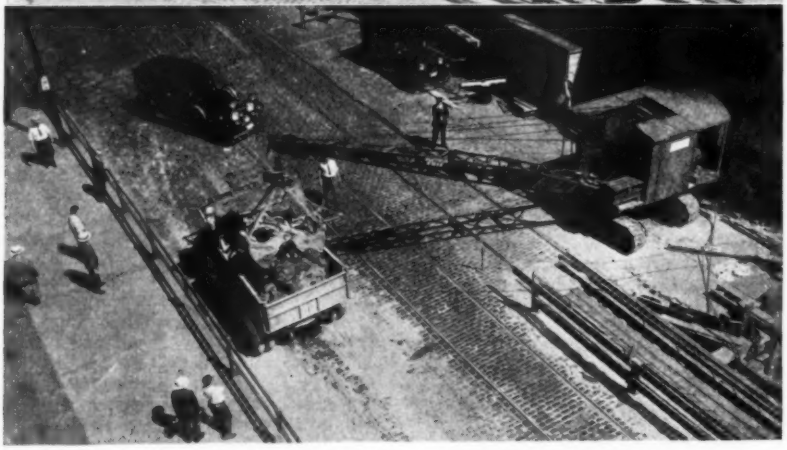
By G. E. PETERSON

Recent State Highway Department low bids have been as follows: **Arthur Johnson Corp.**, New York, $103,457 for grading and temporary pavement on the Grand Central Parkway extension; **Steve Scullen**, Cohoes, $43,905 for 2.1 miles concrete in Saratoga County; **C. B. Whitmore**, Lockport, $151,910 for 2.76 miles of concrete in Erie County; and **A. W. Banko Inc.**, Hastings on Hudson, $465,248 for 3.83 miles of concrete in Queens County.

Low bids in the Metropolitan area have been as follows: **Lynn Avenue Construction Co.**, Yonkers, $40,498 for sewer and paving in Yonkers; **Boudin Contracting Company**, New York, $139,740 for drainage and paving at Philadelphia Navy Yard; **Godwin Construction Company**, New York, $105,500 for reconstruction of piers on the Tri-Boro Bridge approach in Astoria; **Andrew Weston Inc.**, Woodmere, $242,270 for paving, fillwork, and drainage on the Meadowbrook Causeway in Nassau County; **Highway Maintenance Corp.**, Oceanside, $77,103 for paving and storm drains on Oceanside Road in Nassau County; **Thomas Crimmins**, New York, $272,668 for a substructure on the Harlem River bridge; **A. & J. Cianciulli**, Yonkers, $73,921 for sewer and paving in Yonkers; **Greco & Ering**, New York, $87,777 for water mains in the Boro of Richmond; **Walthaw Company**, New York, $49,196 for paving in Brooklyn; **DeCarie Incinerator Company**, New York, $80,875 for incinerator at Fairfield, Conn.; **Ralph Jannotta**, Roslyn, $61,728 for paving and storm drains in Glen Cove; **Julius Auserehl**, Jamaica, $46,685 for sewage treatment plant at Atlantic Beach; **Hiler Engineering Company**, Brooklyn, $83,477 for incinerator at Bridgeport, Conn.; **Walter C. Reediger**, L. I. City, $53,975 for a section of excavation on the Tri-Boro bridge approach in Astoria; **Luang Construction Company**, Brooklyn, $530,324 for storm sewers in Queens; and **John D. Walsh Inc.**, New York, $93,456 for grade elimination at Peth, New York.

Pennsylvania Notes

Shown above is a Bucyrus-Erie Type B steam shovel digging the spillway of the Still Creek Dam, below, which is being constructed by **Gannett. Eastman & Fleming, Inc.**, of Harrisburg, for the Panther Valley Water Company at Lansford. This dam, of the rolled embankment type, is 92 feet high and contains 400,000 yards of fill. It will store, when completed, 3,000,000,000 gallons of water to be used for domestic and industrial purposes. Gannett, Eastman & Fleming, Inc., tell us that this particular shovel shown in the photograph has worked on many tough jobs, has given good service, and is still going strong notwithstanding its twelve years of faithful service. The shovel was purchased in May, 1923, and was put to work by this company on the Bear Gap Water Company's Dam No. 2 at Shamokin, Pa. The following year the shovel was used on the construction of the Roaring Creek Water Co. Dam No. 6 at the same town; Red Lion Water Co. Dam at Red Lion, Pa., in 1926; the West Penn Water Co. Dam at Burgettstown in 1928; a dam for John Warren Watson at Southern Pines, North Carolina, in 1929; the Catskill Dam for the Village of Catskill, New York, in 1930; and the Panther Valley Water Company dam near Tamaqua in 1932; and on the present project which is nearly completed. In



addition, of course, it was used on many other projects as only the larger ones are listed. This company tells us that they have maintained the shovel in good condition and they feel that there is still lots of work yet to be obtained from this machine.

SAVE CRANE TIME!
FINISH JOBS FASTER!
Make MORE Profit!

The Williams "Champion" Bucket has an exclusive power-arm combination of lever and block-and-tackle which reduces handling time by developing greater digging power with less cable overhaul. *Write for Bulletin.*

We also build Multiple-Rope and Dragline Buckets. *Write for Bulletins.*

THE WELLMAN ENGINEERING CO.
7002 Central Ave., Cleveland, Ohio

WILLIAMS BUCKETS

Illinois Notes

Illustrated here is **M. G. Boyle and Company's** Bucyrus-Erie 1030 gas crane at work on an excavating project for the Chicago Sanitary District. The district is engaged in a huge program of revamping Chicago's sewers. Several sewage treating plants are under construction in various parts of the city, and new intercepting sewers are being built to convey the sewage to the plants for treatment. The photograph shows Mr. Boyle's machine at work on Madison Street just outside the Loop. Working as a clamshell, the machine hoists clay from the bottom of the shaft to the trucks on the street. This is being done with apparently little inconvenience to the large volume of traffic normally carried by this busy Chicago street.

St. Louis and Vicinity

By A. J. KOENIG

Bids for the construction of a trunk and relief sewer at Wood River were received with the low bid about five percent above the estimated cost. **R. B. Higgins**, St. Louis, was low bidder for the electric pump-equipped sewer with a figure of $415,000. The low bid of $449,283 for the job with a Diesel driven pump was submitted by **W. S. Hardwick Construction Company**, Memphis, Tenn.

With the fall of the Mississippi River at Alton, Illinois the **Engineering Construction Company** started the preliminary work on the dam to be constructed at this point.

Clayton, Missouri, voted $226,000 for the construction of Outfall Sewer District sewers.

Kansas City, Missouri, plans the construction of a concrete and steel viaduct 645 feet long at 63rd street and Frisco tracks. Estimated cost $700,000.

OTTO KOCHTITZKY

Otto Kochtitzky, who planned and supervised the Little River Drainage system for southeastern Missouri died June 23 at the age of 80 years. When the Little River Drainage System was constructed 25 years ago it was the largest in the world. The system of canals and ditches drained 3,000,000 acres of lowlands and extended from Cape Girardeau to the Arkansas Line. Mr. Kochtitzky is survived by his widow, two sons and two daughters.

Contract for the completion of the superstructure of the Wabash Railroad single track bridge across the Missouri River at St. Charles, Missouri, was awarded to the **American Bridge Company**, St. Louis and the **Mount Vernon Bridge Company**, Mount Vernon, Ohio. Price $1,041,098.

The Concord Construction Company has started construction of 4 miles of 40-foot concrete roadway in East St. Louis.

River Notes

Rock Island District

McCarthy Improvement Company, Davenport, Iowa submitted low bid of $1,999,488, July 16, for the construction of Lock No. 13 near Clinton, Iowa. The principal items of work on this project are: 241,000 yards of excavation; 418,000 yards of fill; 21,500 yards of riprap; and 80,000 yards of concrete.

Alabama Notes

SILAS ALLEN LACY

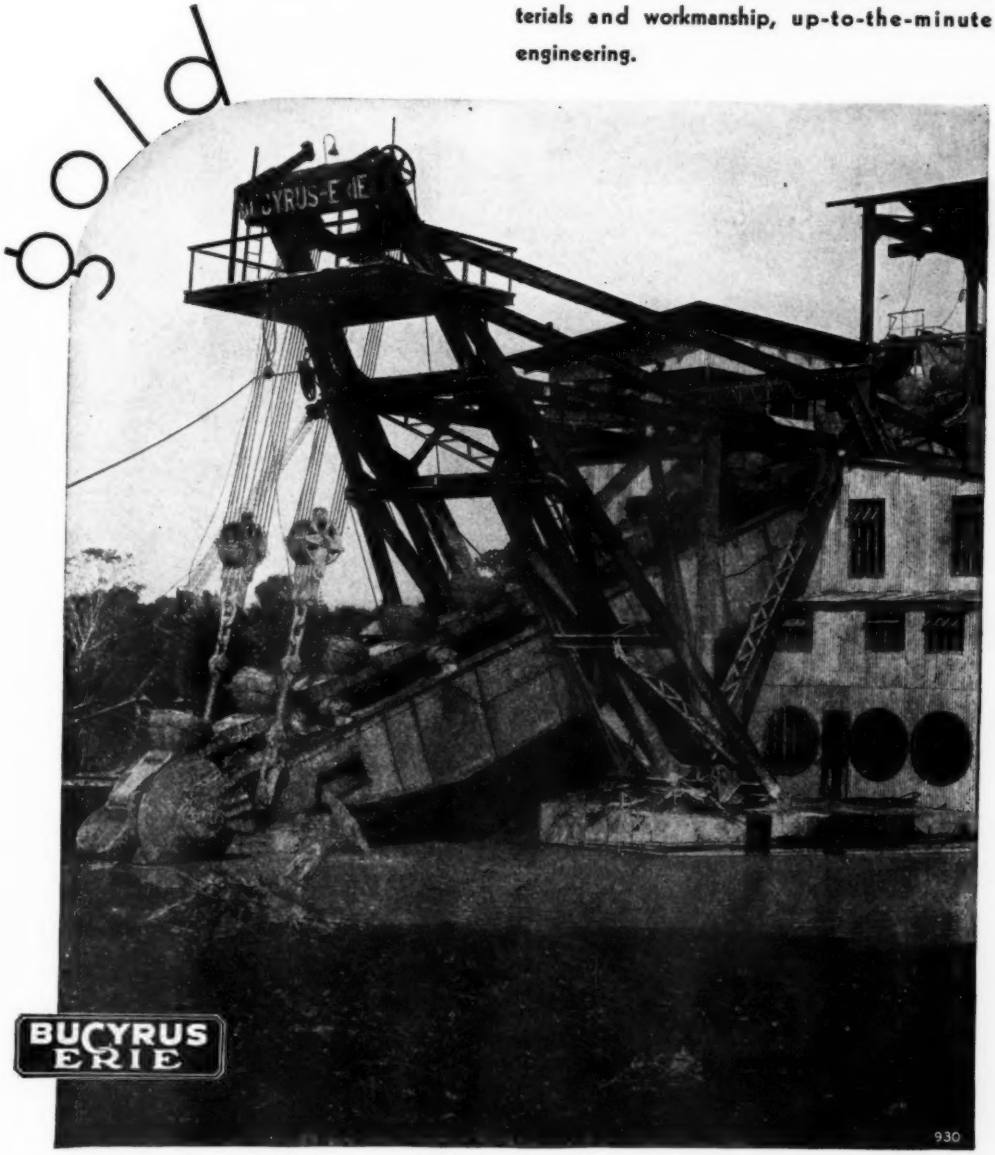
Silas Allen Lacy, 52, died June 9 at his home in Anniston. He was for many years prominently identified with railway and highway construction work in the South. Born in Rockbridge County, Va., he came with his parents at an early age to Anniston where he spent the remainder of his life. His wife, three sons, and four brothers survive him.

Fort Peck Dam Notes

Mason & Walsh Company during the week ending July 16, started on the great job of digging the four diversion tunnels to the full 32-foot diameter. A total of 24,387 feet of tunnelling lies between the headblocks at the outlet portals and the headwall at the inlet portals. Close behind the working face, the concrete lining must be placed. Tunnelling work at Fort Peck through the Bearpaw shale is different from most tunnel jobs in that the concrete lining must be placed at the same time

For your convenience in writing to The Wellman Engineering Co., you will find a card bound in this issue.

WHEN you're after placer gold, you gamble big stakes on the ability of your dredge to recover the full values in your property and to give you consistently high output. Your best insurance of modern quality and quantity in dredge performance is to buy from the world's oldest and largest manufacturer of excavating equipment. You get maximum experience, unified responsibility, capacity to fit your requirements, highest quality of specialized materials and workmanship, up-to-the-minute engineering.



BUCYRUS-ERIE

EXCAVATING, DRILLING, AND MATERIAL-HANDLING EQUIPMENT...SOUTH MILWAUKEE, WISCONSIN

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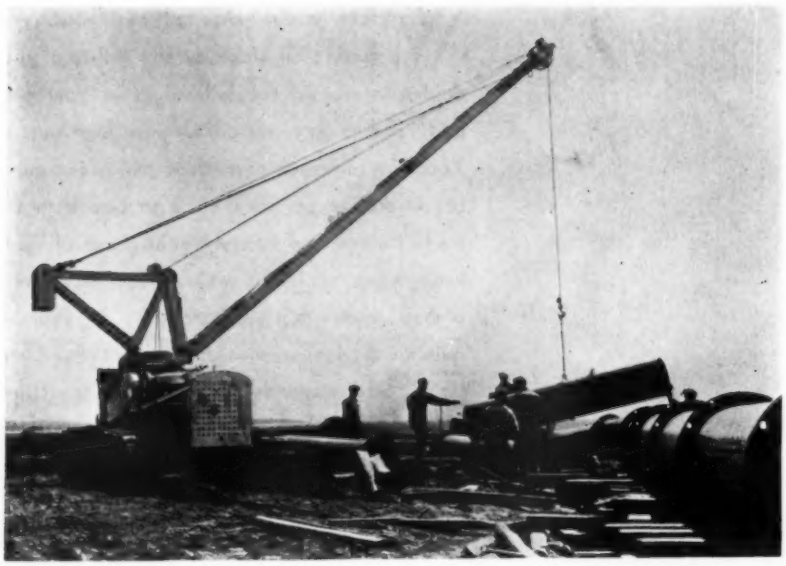


Shots From the Firing Line—
Continued

that excavation is being carried on.

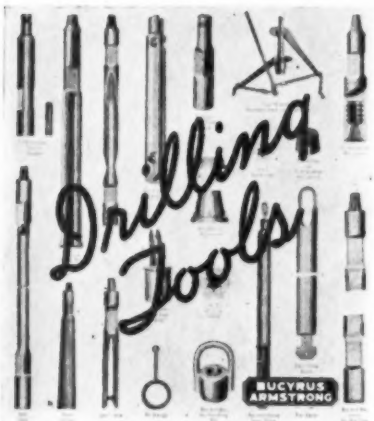
Martin Wunderlich, who has the excavation contract at the lower end of the spillway, was much hampered by rain-water which came down on his operations from the channel above and filled part of the excavation. During one week 2.59 inches of precipitation were received. This water had to be pumped out before work could proceed on full scale. In spite of the delays, Wunderlich is still ahead of schedule by over 100,000 cubic yards.

The Massman Construction Company —Spillway Builders, Inc.—are now working part of their equipment down toward the lower end of the spillway channel. Ahead of schedule by a comfortable margin, they estimate that they will have completed the excavation work by September, although operations will soon become somewhat restricted in the narrowing portions of the spillway. However, continued careful planning of the sequence of cuts made by the shovels should enable them to maintain the present daily rate of output.

Continuous dredging operations have put the base of the dam in shape. On the west side, the level of the core pool is now at elevation 2067, having been raised from about elevation 2042 at the start of the dredging season. Over 11,000,000 cubic yards have been pumped from the upper borrow pit to date.

The four 28-inch pipelines, which carry the fill material from the four dredges now working in the upstream borrow pits to the core of the dam, require frequent shifting as the fill builds up and as the dredges change their positions. The U. S. Engineers use two Bucyrus-Erie CT-50 Loadmasters, powered with Caterpillar Diesels, for the strenuous task of shifting the heavy lengths of pipe as well as for many another lifting job around the dam site. The engineers call the Loadmaster "the handiest piece of equipment on the job". One of these units is shown in the above illustration.

Employment figures for the middle of July stood at 6584, of whom, 5296 persons were obtained from the state of Montana.



BUCYRUS-ARMSTRONG drilling and fishing tools are backed by over 65 years of experience in the field, are of exceptional value because of accurate workmanship and great care given to the selection and treatment of materials. There is no extra charge for the high quality of Bucyrus-Armstrong tools. You will find them fully described, illustrated and conveniently priced in the 48-page Bucyrus-Armstrong tool catalog. *Send for it, today.* 1031

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EXCAVATING, DRILLING & MATERIAL-HANDLING EQUIPMENT • • • SOUTH MILWAUKEE, WIS.

Grand Coulee Dam Notes

By GRACE KIRKPATRICK

A record in excavation said to be unequaled in engineering circles has been made by **Mason-Walsh-Atkinson-Kier**, according to figures recently released. Since December 14, 1934, when their giant belt conveyor commenced to work, they have moved 6,479,549 yards of common excavation and 19,950 yards of rock up to June 1. During May their daily average excavation amounted to 44,800 yards. The bulk of the excavation is from the west end cofferdam, although it includes rock and earth from the east side.

The five-story screening and washing plant for the gravel system is being erected on the hillside back of Mason City. Four sizes of gravel and three of sand will be washed, screened and classified in the building.

Washington Notes

By GRACE KIRKPATRICK

The Lehigh Portland Cement Company's plant at Metaline Falls resumed operations July 5 after being closed since January. Extensive improvements have been made at the plant increasing the capacity and permitting the manufacture of cements such as are contemplated being used in the construction of the Grand Coulee dam.

Nevada Notes

By H. L. LIVINGSTON

The following contracts have been awarded by the State Highway Commission: **C. F. Fredrickson & Sons**, Lower Lake, California, $121,751 for 67.95 miles of oiling in Elko County; and **Dodge Construction Co.**, Fallon, Nevada, $68,473 for 12.41 miles grading and oiling in Lander County.

California Notes

By H. L. LIVINGSTON

The South Fork Irrigation District, Modoc County, California has awarded a contract to **J. P. Brennan**, Redding, in the amount of $98,907 for constructing a 65-foot high rolled earthful dam on West Valley Creek.

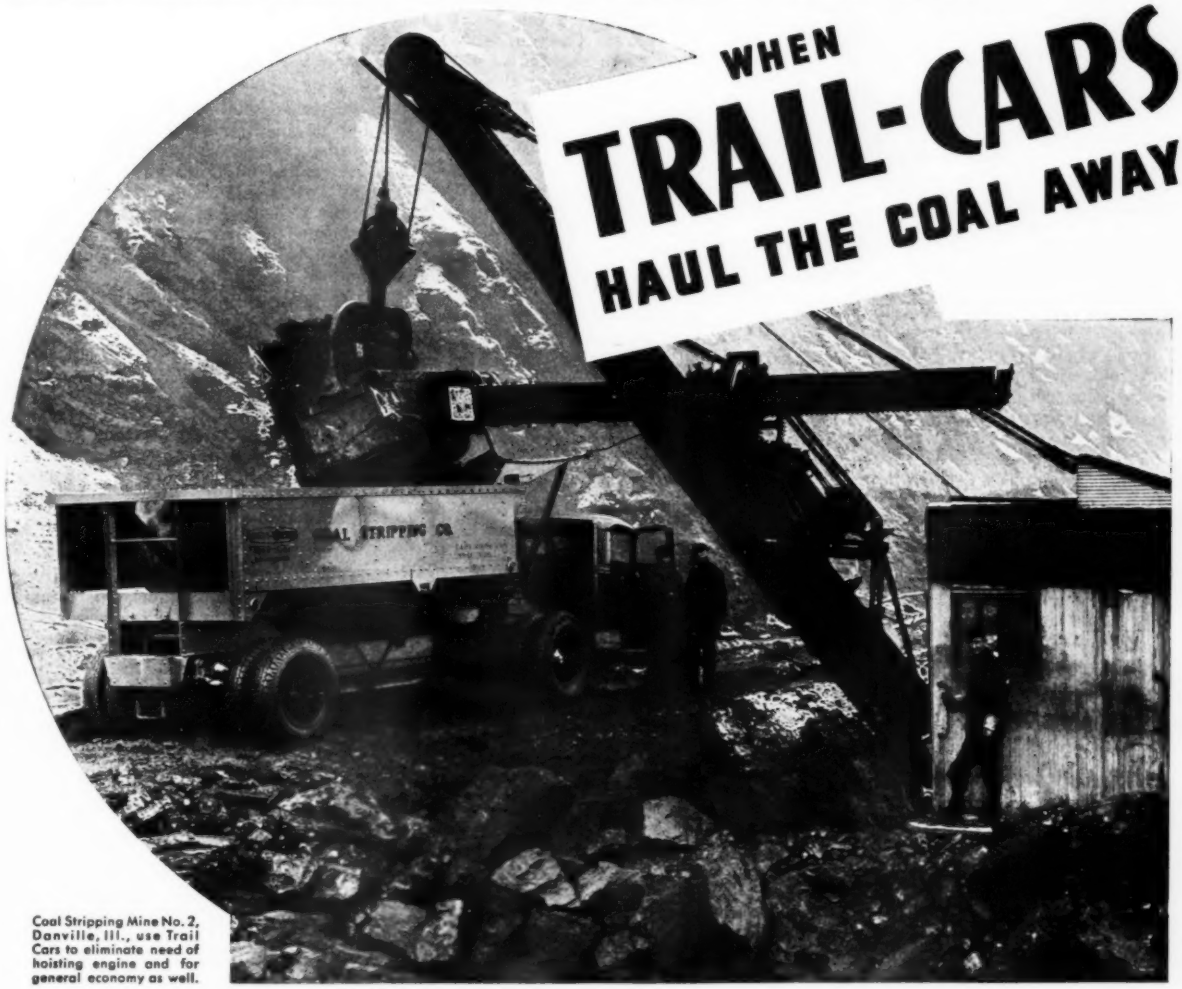
The Bureau of Public Works, San Francisco, have awarded the following contracts: **Claude Wood**, Stockton, $48,644 for 0.718 miles of grading and placing subgrade reinforcement on the Mt. Lassen National Park Highway in Siskiyou and Shasta Counties; and **Tiffany Construction Co.**, San Jose, $4,198 for 4.91 miles of bituminous treatment to the Lassen Volcanic National Park Highway in Tehama County.

The following contracts have been awarded by the Division of Highways: **Peninsula Paving Company**, San Francisco, $88,683, for constructing two timber bridges in Monterey County; **E. F. Hilliard**, Sacramento, $11,260, for 41 miles of liquid asphalt treatment in Butte, Colusa and Glenn Counties; and **C. W. Caletti & Co.**, San Rafael, $148,980, for 0.7 miles of grading and road mix surfacing and two timber bridges in Mendocino County.

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue.

THE SHOVEL *hustles* ALL DAY LONG

WHEN TRAIL-CARS HAUL THE COAL AWAY



Coal Stripping Mine No. 2, Danville, Ill., use Trail Cars to eliminate need of hoisting engine and for general economy as well.

● The swing to Trail Cars is under way at strip mines. This is another evidence of the trend to rubber tired transportation even in the heaviest industrial hauling.

With Trail Car equipment there is no waiting for rails to be laid—no interference between haulage units. The shovel "hustles" all day long and coal costs less laid down at the tipple.

Austin-Western Trail Cars are a favorite in strip mines. They have the capacity that lowers cost, and such advanced construction as air-controlled dumping from the cab—clamshell type bottom door—air brakes for safety on steep grades, and the same ruggedness of construction for which the Austin-Western Dump Car is famous.

Mail the coupon today for descriptive literature on Trail Cars—the cheaper, better way of handling coal.

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Home Office: Aurora, Illinois Cable Address: AWCO, Aurora

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C-9, Aurora, Illinois
Please send details on Austin-Western Trail Cars.
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Address.....
City..... State.....

When writing to The Austin-Western Road Machinery Co., please use coupon or card bound in this issue.

Shots From the Firing Line—

Continued

The Metropolitan Water District of Los Angeles will open bids on August 5 for **constructing Cajalco Dam and dike.** This work comprises an earthfill dam with a crest length of 2,584 feet and a maximum height of 194 feet, together with an earthfill dike and two tunnels 9 and 14 feet in diameter and 2,000 and 2,565 feet in length.

N. M. BALL

N. M. Ball, Berkeley, was killed in an automobile accident, July 4, near Salt Lake City. Mr. Ball, 67 years old, was born in Bement, Illinois. At the age of 21 he moved to Riverside, California, where he entered the construction field. In 1900 he became a partner of the Concrete Pipe & Construction Co., manufacturers of concrete pipe and constructors of canals and irrigation works. He entered the road construction field in 1917. He was a member and director of the A. G. C.

Southern California Notes

By KAY CAMPBELL

Major improvement projects scheduled by the City of Los Angeles for the new fiscal year are expected to total $7,000,000 and will be financed from gasoline tax and other public allocations. Bids on these are to be advertised for soon. They include: Highland Avenue, Cahuenga Avenue to Santa Monica Boulevard, paving at an estimated cost of $280,000; Santa Monica Boulevard, Heath Avenue to Sepulveda Boulevard, $380,000; Figueroa Street, Lomita Boulevard to Wilmington and San Pedro Road, $174,000; N and O Street viaduct, $190,000; North Figueroa Street extension, Second Street to Pasadena Avenue, including grade separations and viaduct spanning Los Angeles River, $2,386,813; Colorado Boulevard, El Modena Avenue to Broadway, $328,000; Washington Boulevard, Los Angeles River to Santa Fe Avenue, including viaduct and grade crossings, $332,632; and four sections of Olympic Boulevard totaling in cost approximately $300,000.

Bids on three flood control projects in the La Crescenta-Montrose flood area, where the tragic and costly New Year's Day flood ran rampant, were opened recently by the Board of Supervisors. **R. A. Wattson** was low on the conduit in Pickens Canyon, with a bid of $119,860. **Gogo and Rados** were low with a bid of $66,899 on the Verdugo Wash from Kenilworth Avenue to the Los Angeles River project. **George J. Bock Company** was low on the Hall-Beckley debris basin job with a bid of $37,401. Work has already started on the latter job.

The final link in the General's Highway, connecting the General Sherman tree in Sequoia National Park with the General Grant tree in General Grant National park, built by **Mittry Brothers Construction Company,** was officially opened recently to the public. This hard surfaced highway, 48 miles long, constructed at an approximate elevation of 7,000 feet throughout, cost $2,370,000. It is 18 feet wide, with a 40-foot right-of-way and will open to motor travel a marvelous mountain area, hitherto accessible only by trail.

Colorado River Aqueduct Notes

District engineers have recently completed the construction of special underground pumping stations at the Potrero and Cabazon shafts. It is expected that the new pumping equipment will be adequate to handle the large amount of water encountered in the headings which are being excavated from these two shafts in the San Jacinto tunnel. Work on this tunnel has been interrupted several times by flows which exceeded the capacity of the pumps installed by the contractor. About a year ago a flood in the Potrero shaft reached a height of several hundred feet and caused a shutdown lasting seven months. The District took over the construction of this tunnel last February. The major problem being that of handling the large amount of water present, the District Engineers recommended the use of horizontal centrifugal pumps located at the bottom of each shaft in place of the deep well type turbine pumps which had been used. The feature of the new plan was to locate the pumps in sealed water tight chambers so that even if flooding did occur the pumping could be continued without shutdown.

A chamber of sufficient size to hold the pumps and driving motors was excavated in solid rock at the bottom of each shaft. At the Potrero shaft, which is 796 feet deep, five 2,600-g.p.m. pumps and two 1,000-g.p.m. pumps, operating against an 850-foot head, are installed. Each of the larger pumps is driven by 700-h.p. electric motor while the two smaller ones require 300-h.p. motors. A special cooling system was designed and installed in the pumping room to provide ventilation for the motors.

Similar equipment has been installed at the 246-foot Cabazon shaft, but here the pump chamber is connected with surface by means of an auxiliary shaft which is separate from the working shaft.

The two pumping stations have been placed in operation and it is expected that tunnel excavation will be pushed forward without further interruption from floods.

By KAY CAMPBELL

Crews working under the direction of H. J. King, tunnel superintendent for **L. E. Dixon, Bent Brothers and Johnson,** recently established a new record in tunnel driving, when they drilled 1,795 feet on the Pasadena tunnel during a period of 30 days. The Pasadena bore, being drilled beneath the residential district of that city, is 13 feet 3 inches in diameter. Eighty-five feet of bore were excavated in one 24-hour period. Work on the tunnel was started February 21 and on July 1, had been advanced 5,892 feet.

Work on the Fish Canyon adit of the Monrovia tunnel has been started by **West Construction Company,** following completion of the access road which had to be built up the canyon. Owing to difficulties with water seepage, the progress on the other two portals has been somewhat slower. However, three crews, working 8-hour shifts, have excavated about 2,000 feet in the Monrovia portal and approximately 1,000 feet in the San Gabriel portal.

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Trade Mark Reg. U. S. Patent Office
11-13½% Nickel Manganese Steel
(U. S. Patents 1,876,738 and 1,947,167)
(Other Patents Pending)

For WELDING and RESURFACING BROKEN and WORN DOWN 11 to 14% MANGANESE STEEL PARTS

WELDING ELECTRODES
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For SURFACING CARBON and ALLOY STEEL PARTS WITH LAYERS OF TOUGH, DURABLE, WEAR RESISTING MANGANAL WELDING

STULZ-SICKLES CO., *Sole Producers,* 142 Lafayette Street, NEWARK, N. J.

For your convenience in writing to Stulz-Sickles Co., you will find a card bound in this issue.

MORE compact—easier to ship. Center section of the Bucyrus-Monighan 5-W Walking Dragline revolving frame, with all principal machinery in place, is shipped in one unit, on one car. Easier, quicker assembly and dismantling in the field. Faster, smoother digging. Short controls, close together, operated by finger pressure, enable the operator to keep the bucket constantly "on the go". Time saved—yardage records piled up—top profits on all jobs—that's what the new 5-W Walker gives you! Get facts about the Walker for your next job. Manufactured by Bucyrus-Monighan Company, Chicago, Illinois.

new

ONE OF THE NEW 5-W DRAGLINES ON THE METROPOLITAN AQUEDUCT, CALIFORNIA

BUCYRUS MONIGHAN

Sold by

BUCYRUS-ERIE

EXCAVATING, DRILLING, AND MATERIAL-HANDLING EQUIPMENT...SOUTH MILWAUKEE, WISCONSIN

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue.

Stronger
...LIGHTER
RED ARCH BUCKETS
increase dragline profits because they are strongest where strength counts most. No deadweight—exceptional balance—quicker filling—cleaner dumping and large output. Let us recommend the right Red Arch bucket for your dragline.
BUCYRUS ERIE
962
BUCYRUS-ERIE
Excavating, Drilling, and Material-Handling Equipment - - South Milwaukee, Wis.

EQUIPMENT *You Ought to Know About*

(Continued from page 383)

machinery; synchronized feeding, which is attained through a special arrangement of the spiral feeding screws; and the patented B-G automatic overload-release sprocket, which protects the machine from overloads, by slipping when an overload occurs, and automatically resetting itself. No breaking bolt is required. Other features include: quick-acting, self-locking swivel spout; welded, high-backed buckets with hard facing on lips; slow crowding speeds; and fast traveling speeds.

Heavy-Duty Clamshell Bucket

THE WELLMAN Engineering Company, Cleveland, Ohio, has recently designed and built an entirely new type heavy-duty, Williams clamshell dredging bucket.

The bucket, which is of 3½ cubic yards capacity, weighs over 20,000 pounds. The manufacturer states that the bucket is constructed of: welded-alloy steel, normalized for grain structure; heat-treated shafting; alloy-steel rivets; and manganese steel teeth. It was designed to handle heavy rock in the removal of breakwaters.

Continental Wagon Scraper

A DIRT-MOVING unit of full 5-yard capacity, which is handled readily by "35" and "40" crawler tractors, has recently been announced by the Continental Roll & Steel Foundry Company. The manufacturer states that this unit, known as a wagon scraper, is a combination scoop-up and carry scraper, a hauling dump wagon, and a distributing unit. All operations are performed with only one handling of the dirt or other material. In addition to windrowing and stockpiling, the unit will dump backward like a truck. The wagon scraper will scoop its own load; or it can be used in a fleet of dump wagons or motor trucks under an elevating grader, power shovel, or dragline.

These units are designed and constructed for heavy digging

work. The manufacturer states that alloy steels are used throughout and the latest methods of fabrication, including electric welding, employed. The wagon scraper is carried on two low-pressure pneumatic-tired wheels, which are mounted on high grade roller bearings. All operations—scooping, hauling, and dumping—are controlled hydraulically by one lever convenient to the operator.

Descriptive folders on this unit and the Continental trail-builder and bulldozer can be secured by writing the Industrial Equipment Division, 332 South Michigan Avenue, Chicago, Illinois.

"Have you forgotten that five dollars you owe me?"

"Not yet; give me time."

"ADDED CONVENIENCE IN STARTING AND OPERATING"

A Gardner-Denver Class "WBG-315" Portable Compressor Unit equipped with Twin Disc Clutch.

When the oldest builders of high-speed vertical water-cooled compressors in America wanted added convenience in starting and operating, they equipped their Gardner-Denver Portable Compressors with Twin Disc Clutches.

The Gardner-Denver Company selected Twin Disc Clutches "because of their widespread use on industrial engines and because of previous experience with Twin Disc Clutches which had been satisfactory. Also there was a broad line from which we were able to select the proper sizes and types to suit our requirements for our complete line of compressors."

Write for specific recommendations. Engineering data on request. ***Twin Disc Clutch Company, 1335 Racine St., Racine, Wisconsin.***

TWIN DISC CLUTCHES

SPEEDY LOW-COST DIGGING *with* ELECTRIC DRIVE

Dependable equipment that moves earth fast, that keeps it moving without a let up—that's what cuts the cost of digging and puts cold, hard cash in the pockets of money-making contractors.

Westinghouse electric drive **for shovels and drag-lines stays on the toughest jobs until contracts are completed—and protects your profits by assuring low-cost operation and low maintenance.**

Specify ***Westinghouse*** **electric power for** ***your*** **dirt-handling equipment.**

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Westinghouse Electric & Manufacturing Co.
East Pittsburgh Pennsylvania

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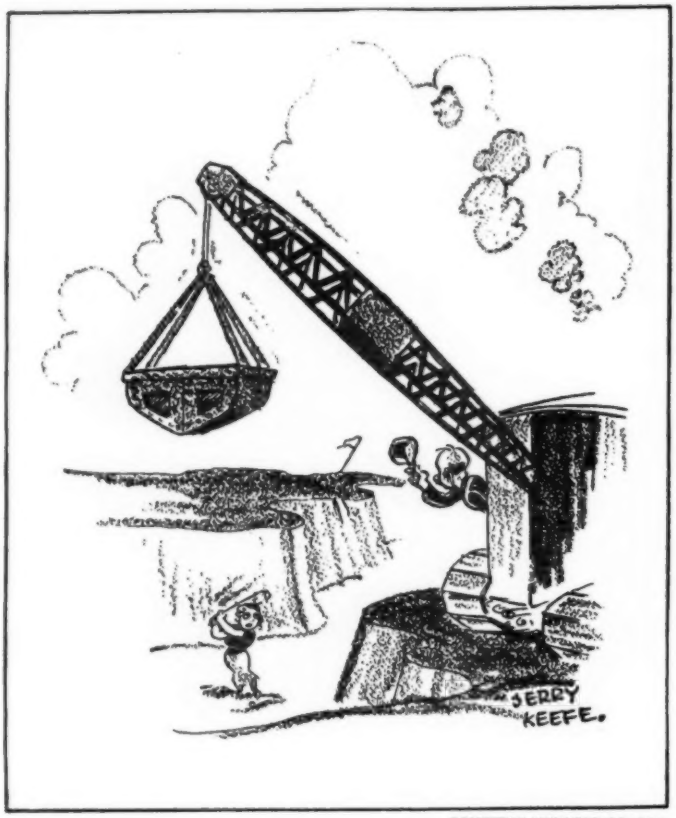
Westinghouse

ELECTRIC SHOVEL DRIVES

Not in the Contract



COURTESY MIDWEST GOLFER

"Can I give you a lift, lady?"

Mrs. Brown: "Do you know, dear, I was reading the other day that an ostrich can see very little, and can digest anything."

Mrs. Smith: "What an ideal husband!"

1st Powderman: "What caused the explosion at your house?"

2nd Powderman: "Powder on my coat sleeve."

He (over the phone): "What time are you expecting me?"

She (coldly): "I'm not expecting you at all."

He: "Then I'll surprise you."

Lady: "So you are on a submarine. What do you do?"

Sailor: "I run forward and hold her nose when we want to take a dive."

Voice on phone: "John Smith is sick and can't attend class today. He requested me to notify you."

Professor: "All right. Who is this speaking?"

Voice: "This is my roommate."

The undertaker's very smart,
He'll never need the dole;
For he gets rich when other folks
Are going in the hole.

A man wandered into a tennis tournament the other day and sat down on the bench.

"Whose game?" he asked.

A shy young thing sitting next to him looked up hopefully.

"I am," she replied.

"Young man, I understand that you have made advances to my daughter."

"Yes, sir, I wasn't going to say anything about it, but now that you have, I wish you could get her to pay me back."

On one of the billboards featuring an advertisement for Smith Brothers cough drops a slogan reads:

"Take one to bed with you."

Under which some clown has added:

"I wouldn't sleep with either of 'em!"

Hotel Clerk: "Inside, or outside room, sir?"

Guest: "Inside, I guess; it looks like rain."

The magazine subscription man was met at the door by the colored maid.

"I would like to see the lady of the house," he said.

"Lawsy, I specs you would—she's taking a bath."

Three shop girls were enjoying a selection by the orchestra.

"Isn't it divine! Wonder what they're playing?" said Madge.

"It's the sextette from 'Lucia'," announced Tillie positively.

"No, it's 'Tales from Hoffman'," persisted Annabelle.

"I think that you are both wrong; but there's a card up there—I'll go and see for myself!" announced Madge, suiting the action to the word. She came back triumphant.

"You're way off, girls! It's the 'Refrain from Spitting'."

HELP *for dragline men*

IF you use chain you need these links and rings, which the many enthusiastic owners say are indispensable. The BECO Link permits quick repair of broken chain and fast connection in chain rigging. The BECO Ring revolves, spreading wear around its circumference — allows free movement of chain and sets itself for direct line pulls. You need them — they'll save time and money. Order them today!

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EXCAVATING, DRILLING & MATERIAL-HANDLING EQUIPMENT • • SOUTH MILWAUKEE, WIS.

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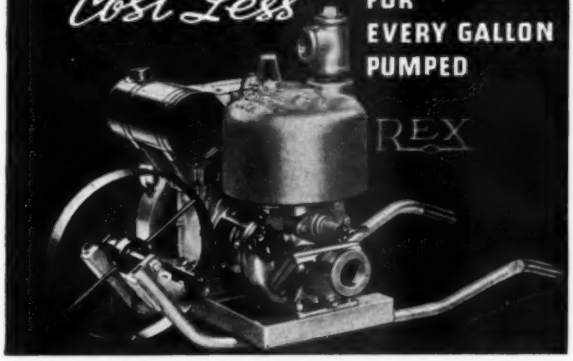
REX SPEED PRIME PUMPS

Cost Less FOR EVERY GALLON PUMPED



Rex Pumps keep their prime when flow and seepage stop

FASTEST PRIMING TIME — GREATEST CAPACITY — GREATEST AIR HANDLING ABILITY — SIZE FOR SIZE — POWER FOR POWER LIFT FOR LIFT

Get 1935 Prices

A complete line of pumps — 2 to 8 inches — sized and powered for every job.

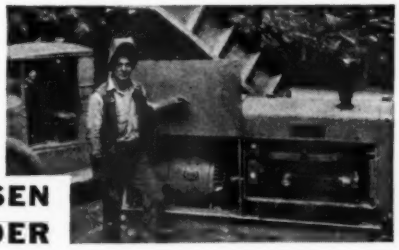
Send for full information.

Carried in Stock in 50 Cities

CHAIN BELT COMPANY

1652 W. Bruce Street, Milwaukee, Wis.

BACK ON THE JOB IN A HURRY!



with a P&H-HANSEN ARC WELDER

Breakdowns aren't what they used to be with wires to the factory and all that! Now you can wheel up your portable P&H-Hansen (it'll go anywhere behind your car) and repair broken parts, make new ones with little time out and small expense. You can use it in all kinds of steel fabricating work. Its wide welding range and simple operation give you arc welding at its best. Write for full details today.

HARNISCHFEGER CORPORATION—*Established 1884*
4517 West National Avenue, Milwaukee, Wisconsin

P&H-HANSEN ARC WELDERS

LeTOURNEAU BUGGIES

UP SHOVEL OUTPUT 20 to 40%

All Feet on Ground—The LeTourneau Buggy's double oscillating walking beams force each tire to carry its full share of the load regardless of ground inequalities.

Shovel production jumped sharply at such widely separated points as Bonneville Dam, the All American Canal, Piedmont Dam, Ohio, and the Mississippi Levees when LeTourneau Buggies rolled onto the jobs. Here's why:

- The wide body of the Buggy makes for easier, quicker bucket dumping.
- The Buggy is quickly spotted, easily maneuvered in tight corners.
- Its great capacity—25 to 30 yards loose measure—makes fewer spottings necessary.

Data from the many jobs where Buggies are in use prove these savings increase shovel output from 20 to 40%

- Ask our Engineers how LeTourneau Buggies and other LeTourneau Equipment can speed up your job.

CONTRACTOR DESIGNED — JOB PROVED

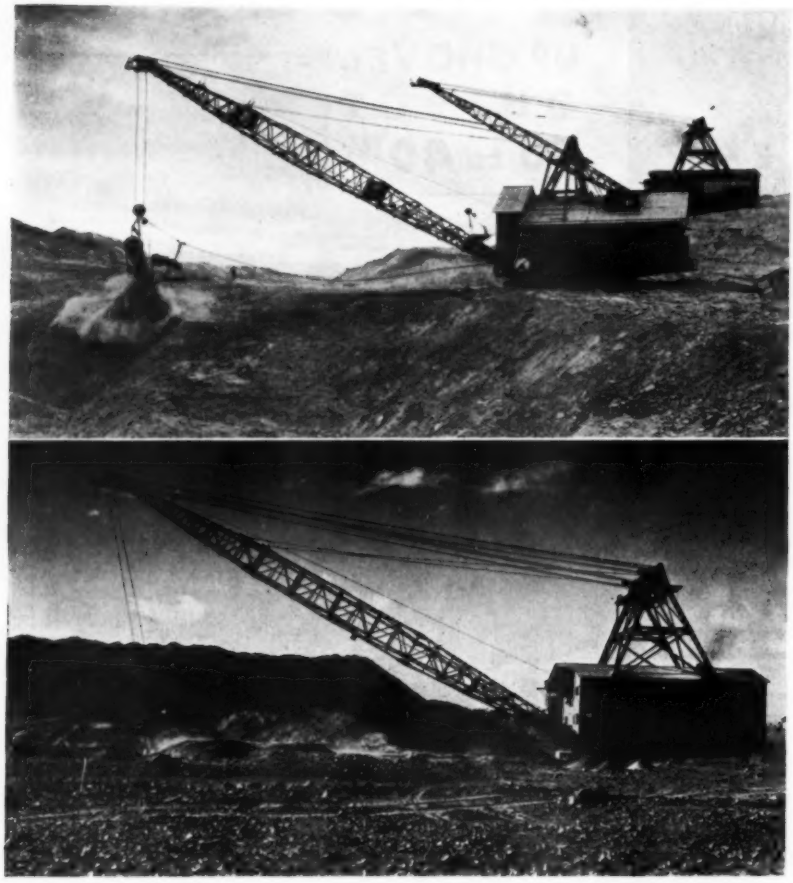
R. G. LeTOURNEAU, INC.

Peoria, Illinois Stockton, California

Manufacturers of: Angledozers, Bulldozers, Buggies, Sheep's Foot Rollers, Rooters, Carryall Scrapers, Derricks, Power Control Units.

Draglines Speed Progress on All-American Canal

(Continued from page 374)



● *Top: A 12- and 6-yard Bucyrus-Monighan work side by side on the east end of W. E. Callahan Construction Company's contract. Bottom: Farther west, the second of Callahan's two 12-yard machines digs its way through the gravel formation.*

further built up by two plates of 1¼-inch steel riveted in between the main members, with heavy welded beads run along the edges.

The excavation work is carried on day and night. Four crews are used, each working 6-hour shifts.

The W. E. Callahan Construction Company of St. Louis, has for years engaged successfully in levee work along the Mississippi and recently constructed Madden Dam for the U. S. Government near the Panama Canal. The organization is made up of W. E. Callahan, President; Paul Grafe, Vice President; Major L. D. Crawford, Vice President and General Manager; Wm. McCormick, Secretary-Treasurer; and V. H. Gray, Superintendent of Construction. Herman Gunther and J. P. Shirley joined with the Callahan organization in the building of the Madden Dam and are jointly interested in this contract on the All-American Canal.

● *Operations on this gigantic project proceed night and day. With the aid of floodlights the digging and hauling operations at night proceed as rapidly as in the day time.*

Six Million Yards Sublet to Boyce & Igo

Boyce & Igo of Baton Rouge, La., are subcontractors on schedule 3 of the Callahan organization's contract and have approximately 6,000,000 yards of excavation. Boyce & Igo are using two Bucyrus-Monighan Diesel-powered draglines, one a 10-W equipped with a 12-yard bucket on a 175-foot boom and the other, a 3-W carrying a 3-yard bucket. A Caterpillar Diesel 75 equipped with LeTourneau bulldozer is used to level off the sand hills ahead of the draglines and to take care of any other heavy work encountered.

Griffith Has Rock Section

The Griffith Company, Los Angeles, holding contract on Schedule 7, has been making good prog-

ress since they started last August. Schedule 7 consists of two sections of rock excavation near Pilot Knob at the east end of schedule 4. One section runs from station 1140 plus 50 to 1148 plus 50 and the second section runs from station 1161 plus 0 to station 1170 plus 50. The estimated quantities on these two sections were 40,000 yards of common excavation and 500,000 yards of rock excavation. The excavation in the north section (at this point the canal runs approximately north and south) has been finished, and operations are well under way in the south section.

A Bucyrus-Erie 43-B Diesel-powered shovel was used on this job until it was transferred to a new job on the Colorado River Aqueduct. Since then, a two-yard Northwest shovel handles the excavation and loads to two LeTourneau 25-yard dump buggies which are mounted on 16 pneumatic-tired wheels. Each buggy is towed by a Caterpillar Diesel 75. A Mack truck with a 12-yard dump body is also used. The rock

● *Schedule three of the canal passes through some rough country. Here Boyce & Igo use a 12-yard Bucyrus-Monighan dragline on 6,000,000 yards of excavation. A finished section of the canal can be seen under the boom.*

is removed in 30-foot lifts and dumped in ravines adjacent to the cut.

Two Cleveland wagon drills sink 25 to 30-foot holes spaced about 26 feet apart. The rock is hard to drill. And frequently the drillers encounter a stratum of extremely hard rock which varies from 3 inches to 3 feet in thickness and which requires frequent changes of bits in order to penetrate it. The usual blasting practice is to fire from 68 to 80 holes at one time after they have been chambered sufficiently to receive their charge of Atlas explosive. A load of about one and one-half

PERFORMANCE . . .
the Measure of Dependability

MORE than 90 per cent of all electric shovels manufactured by the two leading shovel manufacturers are operated by General Electric equipment. The significance to you of this figure is not in the percentage alone, but in the valuable experience gained both by General Electric and these manufacturers through co-operation—experience that, incorporated into these shovels, means satisfactory operation, year after year. General Electric, Schenectady, N. Y.

020-197

GENERAL ELECTRIC

HAYWARD BUCKETS
GOOD FOR YEARS OF HARD SERVICE
A HAYWARD Bucket is an investment, not a gamble. It helps you make a profit on every job.
THE HAYWARD COMPANY
52-54 Church Street
New York, N. Y.

WEATHER PROOF

GREDAG
REG U. S. PAT OFF
LUBRICANTS
Resist RAIN and MUD
HEAT and DUST

UNEXCELLED FOR EXCAVATING, HANDLING AND ROAD BUILDING EQUIPMENT

PURE ELECTRIC FURNACE GRAPHITE AND HIGH QUALITY GREASE

Gredag Lubricants develop graphitic bearing surfaces, pressure, heat and water resistant, which insure an unbroken film of lubrication under the most severe operating conditions.

NATIONAL CARBON COMPANY, INC.
Carbon Sales Division, Cleveland, Ohio

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

● *Callahan's 6-W dragline encounters tough digging here. Cemented gravel and rock throw a heavy burden on the excavator.*

pounds of powder is required per yard of rock. As much as 30,000 yards of rock has been broken up at one shot. When large blocks are found after a blast, they are drilled with Ingersoll-Rand Jackhamers and blasted to shovel size.

The canal section through the rock area has a width of 69 feet at the bottom. In some places, excavation reaches a maximum depth of 115 feet, with a width of 250 feet at the top.

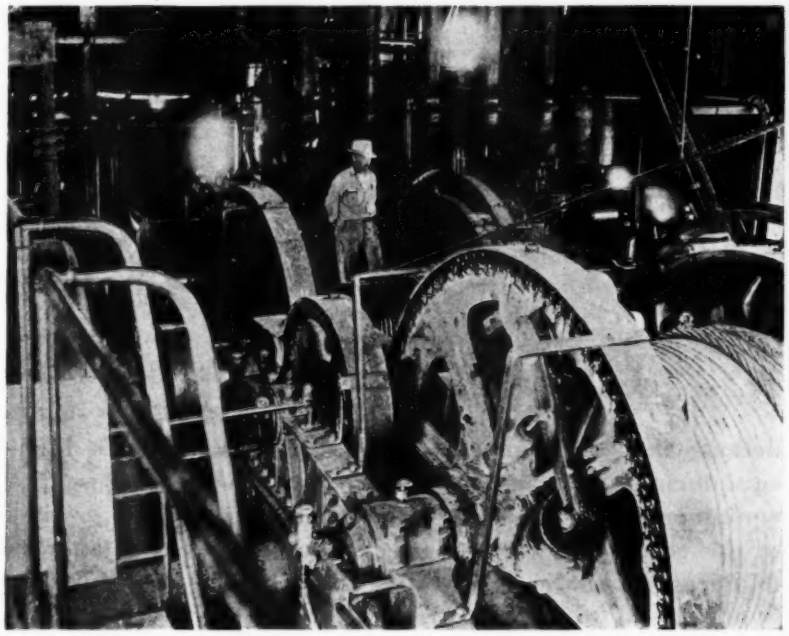
Officials of the Griffith Company are S. M. Griffith, President; John A. Holmstrom, Vice President in charge of construction; Cliff Bong, Construction Superintendent.

Force Account Work Used as Relief Measure

At the west end of the Canal, near Calexico, California, excavation has been carried on with force account labor financed by PWA relief appropriations to relieve distress caused by last year's drought. A section of canal approximately four miles long, is being built east of this city and another section 6½ miles long, west of the city. The laborers engaged on this work are farmers from the district, who receive an hourly wage from the Government for which each must furnish a team of mules, or horses, and fresno, in adition to his services for a 6-hour shift. At times, employment on this work has reached as high as 300 men. The hard top soil lying over the canal section is scraped off with tractor-drawn scrapers. These are followed by tractor-drawn plows or rippers which loosen the subsoil so that the horse- or mule-drawn fresno can get a good bite. The

● *This Caterpillar Diesel 50 hauls fuel oil to Callahan's draglines. Diesel power is practically standard on the Canal.*

● *At the west end of the 80-mile canal near Calexico approximately 11 miles of the canal are being built as a relief project. A Caterpillar Diesel tractor pulls a ripper through the compacted soil. The section is then excavated to grade by the teams of mules or horses and fresnos.*



● *Inside a Bucyrus-Monighan 10-W. A 450-h.p. Fairbanks-Morse Diesel engine drives the hoist and drag drums through a heavy belt. Another belt drives a generator which supplies power for the Ward-Leonard swing. Clutches and brakes on the big drums are air operated.*

excavated material is dumped on both sides of the channel and leveled off so that a road can be laid on top of the bank. Output figures for this class of work show an average of approximately 70 yards per unit per six-hour shift.

Additional Sections Awarded

Awards were made late in May on an additional 23 miles of canal. Lewis - Chambers Construction Company, Inc., New Orleans, whose successful bid totaled $505,500, was awarded 7,790,000 yards of canal excavation, extending from station 1860 to station 2740. At the time this was written, this contractor was moving in a Bucyrus-Monighan 5-W, a Bucyrus-Erie 52-B, and a 45-B, all Diesel-powered draglines.

Mittry Bros., Los Angeles, on their bid of $260,400, were awarded schedule 4, extending from station 2740 to station 3090 plus 75, and involving 3,472,000 yards of excavation. Information as to this contractor's plans and equipment was not available.

Construction work on the All-American Canal is being done under the direction of the Bureau of Reclamation, Elwood Mead, Commissioner. The project office is located at Yuma, Arizona, under the charge of R. B. Williams.

SAUERMAN

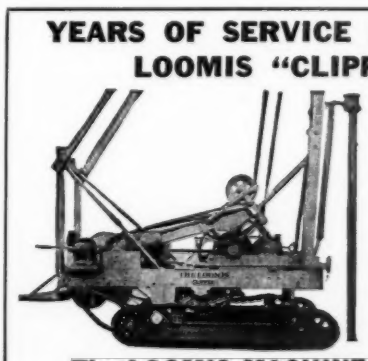
Whenever you have a job of moving dirt or bulk materials any distance from 200 to 1500 ft., you probably can cut expenses by using a Drag Scraper or Slackline Excavator. Put your long haul problems up to us.

Write for new 56-page Catalog.

SAUERMAN BROS., Inc.
474 S. Clinton St. Chicago

LONG RANGE MACHINES

YEARS OF SERVICE in every LOOMIS "CLIPPER" DRILL



Hundreds of drillers are still getting more hole per day at lowest cost after years of heavy duty work with Loomis drilling machines.

The LOOMIS MACHINE COMPANY
K Street Established 1842 Tiffin, Ohio

This Trademark Gatke means Quality Safety Economy

You Can Get It on Every Type of Friction

GATKE — Asbestographite Brake Blocks and Frictions are moulded in any size and shape to machined perfection. Made for every type of brake, friction, and clutch . . . do away with adjustments, slipping, and sticking . . . prevent wear and tear, and increase efficiency of equipment. Send your brake and friction problems to Gatke.

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228 N. LaSalle St.
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Brake Blocks and Frictions for Every Industrial Use
GATKE MOULDED BEARINGS
Asbestos and Fibre Packings
Automotive Brake Linings, Clutch Facings, and Timing Gears

EXCAVATING ENGINEER Bargain Counter

★ ★ ★ **THE ITEMS LISTED on these pages have been selected because they offer unusual values to the man who is looking for a bargain. Some of this equipment is surplus stock which has never been used, some is rebuilt and carries new equipment guarantee, some is just plain used. But every item is priced for quick sale. If any of this equipment fits your needs send a postcard or letter, mentioning the reference number, to *Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.* We'll pass your inquiry along to the owner and you will receive price and complete information promptly. Act now — with advancing prices on new stock this equipment will move fast.**

SHOVELS-CRANES DRAGLINES

P&H MODEL 208—45' BOOM DRAGLINE—4-cylinder 7¾"x9" Twin City gasoline engine and 1½ cu. yd. Omaha bucket. SCD-20.

MEAD-MORRISON GASOLINE COMBINATION SHOVEL-CLAMSHELL. ½ cu. yd. Dipper, 17' Dipper handle—18' Boom—32' Clamshell Boom and ½ yard Erie Clamshell Bucket. 5"x6" 4-cyl. Wisconsin Engine. Good mechanical condition. Bargain Price. SCD-28.

BAY CITY "PUP" GASOLINE CLAMSHELL. Good mechanical condition. SCD-24.

BYERS "BEARCAT" Gasoline ⅝-yard Shovel. Hercules engine. Overhaul. Good mechanical condition. SCD-25.

THEW-UNIVERSAL MODEL 35 — Gasoline — ½ cubic yard standard shovel equipment—25' lattice type crane boom and ½ yard Williams bucket with teeth—complete drag shovel attachment and skimmer scoop bucket, including home-made trailer. Excellent condition. SCD-26.

BUCYRUS-ERIE MODEL 30-B DIESEL SHOVEL—25'9" Boom, 14' Dipper Handle, 1 yd. Dipper. SCD-9.

COMPLETE FRONT END EQUIPMENT

Shovel Equipment

¾ CU. YD. DIPPER — 20' boom—13' Dipper Handle—rope crowd shovel equipment. Suitable for models 1030 or 1035. NEW. SE-1.

¾ CU. YD. DIPPER—23' BOOM—12'6" DIPPER HANDLE—Shovel Equipment suitable for 20-B Gas or Diesel. NEW. SE-15.

¾ CU. YD. DIPPER 25'9" BOOM—14' DIPPER HANDLE—Shovel Equipment suitable for 30-B Diesel. NEW. SE-17.

⅞ CU. YD. DIPPER—21'9" BOOM and ENGINE — 15' DIPPER HANDLE — High Lift Shovel Equipment. Suitable for 31-B Steam. NEW. SE-18.

1 CU. YD. DIPPER—20' BOOM—15' DIPPER HANDLE — Rope Crowd Shovel Equipment, suitable for Osgood "Conqueror." Good mechanical condition. Low Price. SE-24.

1¼ CU. YD. DIPPER — 25' BOOM—17' DIPPER HANDLE — Slightly Used Rope Crowd High Lift Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-5.

1½ CU. YD. DIPPER—27' BOOM——17' DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment suitable only for Bucyrus-Erie 43-B machines. Rebuilt—New Machine Guarantee. SE-23.

1 CU. YD. DIPPER, 26' boom, 15' dipper handle, rope crowd shovel equipment. Suitable for D-2 machine. NEW. SE-4.

½ CU. YD. DIPPER, 16' boom, 13'8" dipper handle. Shovel equipment suitable for type "A" shovel. NEW. SE-30.

⅝ CU. YD. DIPPER, 12'6" dipper handle, 16' boom. Shovel equipment suitable for type "A" shovel. NEW. SE-31.

¾ CU. YD. DIPPER—20'6" BOOM, 17' DIPPER HANDLE, high lift shovel equipment suitable for 20-B steam. New SE-32.

Dragline Equipment

35' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2—20-B—31-B. NEW. DL-2.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2—20-B—31-B. NEW. DL-3.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2—41-B—42-B. NEW. DL-7.

BRAND NEW Ropes included with each of above Dragline Equipments.

All of above equipment is BRAND NEW and of BUCYRUS-ERIE manufacture.

Trench Digging Equipment

1 CU. YD. 42½" WIDE—Solid type Dipper—24' Boom and all auxiliary equipment. Will dig maximum depth 22'. For application to GA-2 or GA-3 Shovel. Rebuilt—New Machine Guarantee. DS-5.

BRAND NEW PAGE, two dippers each ¾ cu. yd., one 38" wide over cutters, the other 49½" wide over cutters. 17'1½" Boom and all necessary auxiliary equipment. Will fit Bucyrus-Erie 1030 or 1035. DS-7.

1-CU. YD. 42½" WIDE SOLID TYPE DIPPER—24' Boom and all auxiliary equipment—will dig maximum depth of 22'—For application to GA-2 or GA-3 Clam Shell or Drag Line. Rebuilt—New Machine Guarantee. DS-8.

BRAND NEW Ropes included with each of above Trench Digging Equipments.

Skimmer Scoop

¾ CU. YD. DIPPER—20' Boom together with all necessary ropes and material to completely convert Bucyrus-Erie 1020 Shovel, Clamshell or Dragline to Skimmer Scoop Machine. NEW. Shipment 2 to 3 weeks. SS-1.

CLAMSHELL EQUIPMENT

50' BOOM CLAMSHELL EQUIPMENT including front drum and gearing but not including ropes. Practically new condition. Can be applied to Type B or B-2 machines. CS-1.

DIPPERS

Small Machines

3 ½ CU. YD.—Plate Front—Will fit 1020 Drag Shovel. New. D-45.

2 ⅝ CU. YD.—Plate Front—Will fit 20-B. New. D-12.

1 2/3 CU. YD.—Plate Front—Will fit 14-B. New. D-13.

2 ¾ CU. YD.—Rock Type—Will fit 20-B. New. D-15.

1 ¾ CU. YD.—Rock Type—Will fit 20-B Tunnel Shovel. New. D-41.

1 ⅞ CU. YD.—Plate Front—Will fit 1030 or 1035. New. D-18.

2 ⅞ CU. YD.—Ins. Tooth—Will fit 1030. New. D-47.

1 1 CU. YD.—Ins. Tooth—Will fit 1030. New. D-48.

1 1 CU. YD.—Ins. Tooth—Will fit 1030. New. D-49.

1 1 CU. YD.—Plate Front—Will fit 20-B. New. D-42.

1 1 CU. YD.—Manganese—Will fit B-2 and GA-2. Good condition. Used. D-40.

1 1 CU. YD.—Rock Type—Will fit 1030 Tunnel Shovel. New. D-50.

2 1¼ CU. YD.—Ins. Tooth—Will fit 30-B, 42-B, E-2. New 41-B, D-44.

1 1¼ CU. YD—Cast Front—Will fit 30-B, 42-B, E-2. Used. 41-B, D-43.

1 1¼ CU. YD.—Rock Type—Will fit 30-B, 42-B, E-2. Used. 41-B, D-27.

1 1¼ CU. YD. — Ins. Tooth — Will fit New. 37-B. D-51.

1 1¼ CU. YD. — Ins. Tooth — Will fit Used. 37-B; D-52.

1 1¼ CU. YD. — Ins. Tooth — Will fit Used. 37-B. D-38.

2 1½ CU. YD.—Ins. Tooth—Will fit 42-B, New. 43-B. D-55.

1 1½ CU. YD.—Ins. Tooth—Will 43-B. Used. D-39.

1 1¾ CU. YD.—Plate Coal—Will fit 50-B. New. D-57.

3 1¾ CU. YD.—Ins. Tooth—Will fit 43-B. New. D-58.

1 1¾ CU. YD.—Ins. Tooth—Will fit 43-B. New. D-59.

Large Machines

1 2 CU. YD.—Manganese—Will fit 43-B. New. D-62.

1 2¼ CU. YD.—Plate Coal—Van Clark Teeth—Will fit 50-B. New. D-63.

2 3 CU. YD.—2½" Molybdenum cast steel front, two part Van Port reversible teeth—Will fit 100-B, 68-C, 70-C. New. D-2.

1 3½ CU. YD.—2¾" nickel chrome steel front, two part Van Port reversible teeth—Will fit 88-C, 95-C, Class 80 Atlantic. New. D-3.

1 4 CU. YD.—2¾" Molybdenum cast steel front, two part reversible teeth. In good condition.—Will fit 100-C, 120-B. Used. D-4.

2 6 CU. YD.—Molybdenum steel front. Annealed cast steel back, two-part Reversible Van Port Teeth.—Will fit 200-B, 225-B and 320-B. New. D-11.

1 8 CU. YD.—Front Molybdenum steel, two part Van Port Reversible teeth. Slightly used but excellent condition.—Will fit 320-B. Used. D-6.

PUMPS

1 NB—3 STAGE CENTRIFUGAL PUMP—2" suction and discharge — bronze impeller and shaft—capacity 100 gallons per minute at 240' head operating at 1720 RPM or 270' head at 1780 RPM. Now equipped for belt drive but can be operated by 15 HP Electric Motor. ME-6.

DRAGLINE BUCKETS

5 ¾ CU. YD.—BECO TYPE "X". 2200 lbs. New. DB-21.

1 1 CU. YD.—PAGE CLASS "C". 3460 lbs. Used. DB-20.

1 1½ CU. YD.—BECO TYPE "X". 4200 lbs. New. DB-22.

1 1¾ CU. YD.—OMAHA—STD. 3550 lbs. Rebuilt. DB-7.

3 2 CU. YD.—PAGE CLASS "C". 5630 lbs. New. DB-4.

1 2 CU. YD.—BECO TYPE "U". 3700 lbs. Rebuilt. DB-12.

1 2 CU. YD.—BECO TYPE "X". 5300 lbs. New. DB-23.

2 2 CU. YD.—BECO HEAVY DUTY. 5400 lbs. New. DB-24.

3 2¼ CU. YD.—BECO TYPE "U". 3850 lbs. New. DB-13.

4 2½ CU. YD.—BECO TYPE "U". 4100 lbs. New. DB-14.

1 2½ CU. YD.—BECO HEAVY DUTY. 6500 lbs. Rebuilt. DB-9.

1 2½ CU. YD.—BECO TYPE "X". 6800 lbs. New. DB-25.

1 2½ CU. YD.—OMAHA—STD. 5400 lbs. Rebuilt. DB-10.

1 4 CU. YD. BECO HEAVY DUTY. 11000 lbs. New. DB-27.

1 5 CU. YD.—BECO HEAVY DUTY. 12700 lbs. New. DB-28.

1 5 CU. YD.—MONIGHAN HEAVY DUTY. 12000 lbs. New. DB-16.

1 6 CU. YD.—MONIGHAN TYPE "W". 12500 lbs. New. DB-17.

1 6 CU. YD.—BECO TYPE "X". 14400 lbs. New. DB-29.

1 7 CU. YD.—MONIGHAN TYPE "W". 13700 lbs. New. DB-18.

ELECTRICAL EQUIPMENT

90 H.P. MOTOR—GENERAL ELECTRIC—3 phase, 25 cycle, 550 volt, 1500 RPM. NEW EE-1.

50 KW MOTOR GENERATOR SET—GENERAL ELECTRIC—consisting of 75 H.P. induction motor, 3 phase, 60 cycle, 440 volt, connected to 50 KW, 250 volt—1200 RPM Generator, includes suitable rheostat and compensator. NEW. EE-2.

75 H.P. COMPENSATOR—GENERAL ELECTRIC—2200 volt, 3 phase, 25 cycle, manual type. NEW. EE-3.

5 KVA TRANSFORMER—GENERAL ELECTRIC—2200-3810 volt primary, 440-220 volt secondary—3 phase, 60 cycle, with cast iron tank and cover, including specially fastened bushings to prevent oil leakage. NEW. EE-4.

125 KW GENERATOR—WESTINGHOUSE—250 volts, 500 amperes, Direct current. 440 RPM. Includes two outboard bearings. NEW. EE-5.

MAGNETS

1 45" CUTLER-HAMMER MAGNET, Model 542H-14A. Good condition. Requires 10 KW generator to operate. M-1.

LOCOMOTIVES

3 24-INCH GAUGE 3-TON BALDWIN GASOLINE LOCOMOTIVES, Model AL, Type 2. Price very favorable. L-1.

TRAILERS

1-14 TON WILLIAMS "ECONOMY" TRAILER. Arch Girder Construction—Safety Chains—Rear Loading ramp. Solid Rubber tired wheels 28"x10" front 28"x16" rear. Deck dimensions 12'x7'9"x31½" high. NEW. T-1.

ROAD ROLLERS

1 10-TON BUFFALO SPRINGFIELD GASOLINE ROLLER with scarifier. About three years old. Splendid condition. Very favorable price. RR-1.

ENGINES

Designed especially for application to Excavating or similar Equipment. Can be used for stationary or semi-stationary service.

Diesel

2—140 H.P. NEW, NON-REVERSIBLE ATLAS DIESEL ENGINES—5 cylinder, 9" bore x 10½" stroke, 514 R.P.M., 4 cycle, vertical overhead valves, dust proof, oil tight crank case and forced lubrication. Includes auxiliary air starting equipment. DE-2.

1—45 H.P. NEW, NON-REVERSIBLE ATLAS DIESEL ENGINE—4 cylinder, 6" bore x 8" stroke, 650 R.P.M., 4 cycle, vertical, overhead valves and forced lubrication. DE-5.

3—110 H.P., NEW, NON-REVERSIBLE ATLAS DIESEL ENGINES—6 cylinder, 7" bore x 8½" stroke, 600 R.P.M., 4 cycle, vertical, overhead valves and forced lubrication. DE-6.

1—75 H.P., SLIGHTLY USED, REBUILT, NON-REVERSIBLE ATLAS DIESEL ENGINE — 4 cylinder, 7" bore, 8½" stroke, 600 R.P.M., 4 cycle, vertical overhead valves and forced lubrication. DE-7.

Gasoline

1 MODEL HH-U NOVO—16 H.P. ENGINE—4-cylinder, 3⅜"x4"—1200 R.P.M.—Radiator cooled—complete power plant—mounted on channels—sheet metal housing—extended crank shaft 1⅞" diameter, including outboard bearing with Fafner ball bearing. New. GE-1.

Steam

1 12½"x16" link reversing type for Railroad Shovel. ME-1.

2 4½"x5" reversible—20.8 H.P. at 400 R.P.M. 100 lb. Pressure. ME-2.

1 4¾"x5" reversible—23.2 H.P. at 400 R.P.M. 100 lb. Pressure. ME-3.

1 5"x5" reversible—25.6 H.P. at 400 R.P.M. 100 lb. Pressure. ME-4.

BOILERS

NEW

Will Make That Old Shovel Work Like New.

Can also be used for Miscellaneous Service

Vertical Type

3 46½"x110"—40 H.P.—155 lb. Working Pressure. Special Wood Burning Fire Box. ASME Std. Will fit any B-2 or B-3. B-9.

2 42"x88"—35 H.P. 144 lb. working pressure. Mass. Std. Will fit type B. B-17.

Locomotive Type

3 44"x17'—75 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 68-C. B-13.

1 44"x18'—88 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 70-C. B-14.

2—70"x12'—136 H.P. 175 lb. working pressure. ASME, and Mass. Std. Will fit 120-B. B-18.

AIR COMPRESSORS

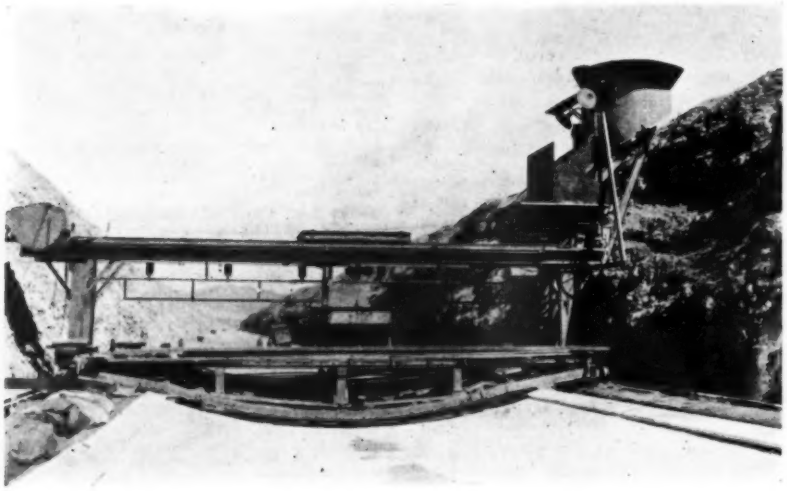
1 BRAND NEW WORTHINGTON—METAL-WELD—2-cylinder 7"x6" Vertical 162 cu. ft. piston displacement, Air Compressor. Fitted with Laidlaw feather valves—Lugs on side for mounting on skids or channels—Shaft extended and equipped with semi-flexible coupling to take 2⅝" drive shaft—Force feed lubrication. Automatic control. Includes 1" High capacity centrifugal circulating pump—"V" belt driven—18"x41" Air Receiver, 100 pounds working pressure. A.S.M.E. Standard. Electric or gasoline power required approximately 30 H.P., approximately 1000 R.P.M.—Compressor Speed approximately 550 R.P.M.—Overall dimensions: Height 45"—length 37½"—width 28". AC-3.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with with fittings. NEW. AC-1.

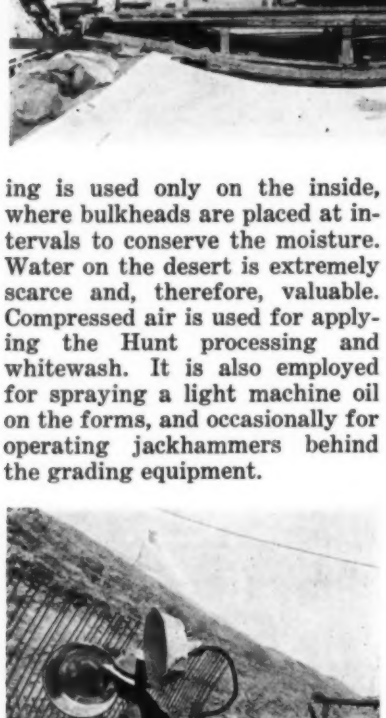
1 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Used. Make offer. AC-2.

Hard Digging on the Aqueduct

(Continued from page 379)



ing is used only on the inside, where bulkheads are placed at intervals to conserve the moisture. Water on the desert is extremely scarce and, therefore, valuable. Compressed air is used for applying the Hunt processing and whitewash. It is also employed for spraying a light machine oil on the forms, and occasionally for operating jackhammers behind the grading equipment.

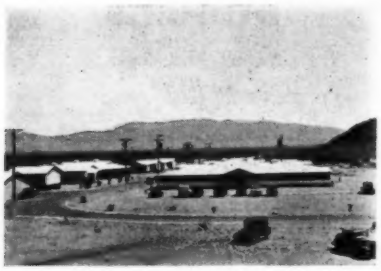


● *Tin dish pans as reflectors help illuminate the work at night.*

● *A Ransome dual-drum model 27-E paver, with a 50-foot boom, mixes concrete for the conduit.*

● *Concrete for the invert is delivered from the mixer to this pouring gantry which deposits the concrete where needed by means of a concrete bucket running on rollers along the top of the gantry. Vibrators are used to compact the mass which is then given a smooth surface by the finisher.*

The gantry for moving the inside arch form is equipped with a 3-hp electric motor operating dual hydraulic hoists. This form is in 7-foot sections, totaling 140 lineal feet, and is moved in 35-foot sections. The outside form consists of ten 7-foot sections, but these are moved as a unit, being lifted three inches or so to clear and then pulled ahead by a specially designed winch. Pours of 70 feet of arch are made each day requiring approximately 190 cubic yards of concrete.



● *Engineering headquarters for District No. 3 is located near Eagle Mountain. This district has control of Schedules 11 to 15 inclusive.*

At the points where the conduit will be crossed by a road, the concrete structure is reinforced with a double mat of ⅝-inch horizontal steel and 1-inch vertical steel, placed on 1-foot centers.

Three Companies are using an extra man for every six on the excavation, staggering the days off so that they can operate continuously 6 days per week. Thus the work goes forward 24 hours a day, with more than two-thirds of the original excavation yet to be done in order to complete the schedule. They are using the Broderick and Gordon tunnel camp at Eagle mountain to accommodate the 140 men working on their project.

Field Notes

(Continued from page 382)

single gun and a 2-inch flat nozzle. The man at the front of the truck with control valve on the gun half open, cleans the posts and wets the guard rail. The man at the rear, using full pressure, cleans the rail thoroughly. It is estimated that on guard rail in use on the Pacific Highway alone, a savings of approximately $9,000 yearly will be effected.

In addition to cleaning guard rails, the Washington State Highway Department uses this equipment to clean bridges, abutments, over-passes and center lines as well as for keeping all its construction equipment cleaned. The latter operation is done at District Highway Maintenance Headquarters.

Care of Chain Drives

KEEPING chains and chain drives in perfect condition insures their operation for a greater length of time without mishaps and proves highly economical through increased efficiency and life for their use on modern construction and engineering machinery. An authority lists five principles of their upkeep and these, together with suggestions as to how they should be carried out, are given herewith:

(a) Keep them in proper alignment. Keeping sprocket wheels on their shafts in alignment with each other is the first requisite, for if they are not in line a side pull will develop and the load will be concentrated on the side of the sprocket teeth and one side of the chain as well. (b) Frequent cleaning. Taking the chain off and soaking or dipping it in kerosene is the best plan. It should be dried well and oiled thoroughly before being used again. Never shut down a machine for any period of time without first cleaning the chain and oiling with heavy oil or grease. Upon resuming operations it should be re-cleaned and light oil renewed. (c) Sprockets should at all times be well-fitting. Watch the sprocket wheels from time to time to make sure they are not worn enough to injure the chain. Teeth may often become worn to a hook-shape which will cut into the chain. (d) Keep the chain in proper adjustment. It should be run just a little slacker than a belt. Too much tension will cause wear on the chain and wasteful friction on the bearings. Not enough on the other hand, will cause the chain to jump the sprockets or ride the teeth and break. (e) Frequent lubrication is a paramount essential. The chains should be lubricated with a good grade of light cylinder oil applied with a paint brush, painting the open joints on the upper side. Oil the closed joints on the inside while the drive is running slowly.

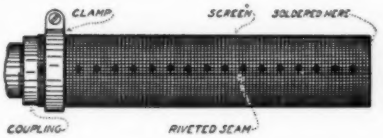
These few precautions will prove of immense value in giving added service and preventing mishaps in the use of chain drives of any kind.

— Ernest W. Fair

Oil Screen Made of Monel Metal

AN OIL STRAINER, as commonly made in the field consists of a perforated pipe covered with a fine mesh wire cloth. The perforated pipe gives the strainer the necessary rigidity against collapse and the wire cloth keeps out the undesirable solids, lumps, dirt, etc.

It is apparent that the perforated pipe would be unnecessary provided a wire cloth of sufficient stiffness could be found to serve the purpose alone. A rugged, durable, fine mesh monel



metal wire cloth was secured and made into a very satisfactory strainer—much superior to the old-fashioned type. Monel metal solders readily, can be fastened into place easily and securely and is cleaned quickly. The total open area through which the oil can flow is much greater without the perforated pipe than with it.

— W. F. Schaphorst, M.E.

POSITIONS WANTED

Positions wanted advertisements will be run under this heading for 5 cents per word, minimum charge $1.00. Advertisements for help wanted free of charge.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California, but will go anywhere. Box 5507.

DRAGLINE-SHOVEL-CLAMSHELL OPERATOR

18 years' experience on general excavating construction and coal mining desires position as shovel or dragline operator. Capable of operating all types and sizes of machines. Best acquainted with Bucyrus 50-B, 30-B, D-2, 225-B steam; Northwest draglines; P&H 206, 600, 400; Lima 101, 404, 601; and Monighan 2-T, 3-T. Can do own repair work and can take charge of equipment if desired. Was superintendent four years for one company. Can furnish good references. Age 34, married. Have operated floating dredges but prefer shovel or dragline work. Available immediately. Will go anywhere for right price and reliable company. Present location, Indiana. Box 7403.

BOOKKEEPER

Young man, 26, married, high school education, 5 years' experience with limestone company, now employed, desires position with limestone company and chance for advancement. Will go anywhere. Box 7401.

OPERATOR

15 years' experience on gasoline, steam and electric machines. Bucyrus-Erie, Thew and Northwest machines. Prefer operating Bucyrus-Erie. Have worked on highway and railroad grading, quarry, excavation. Willing to go anywhere in U. S. A. Can do all repairing and furnish excellent references. Box 7001.

EXPERIENCED DRAGLINE-CLAMSHELL-SHOVEL OPERATOR

Experienced operator desires work anywhere. Has had 15 years' on dragline work, 4 years' operating clamshell machine and 2 years' on a shovel. Experienced on railroad grading, sand and gravel, and general excavating construction work, principally operating steam machine, but has had three years' operating electric, 2 years' on gasoline and 1 year on Gas+Air machine. Prefers large Bucyrus-Erie any type; steam or electric power. Can furnish best of references from former employers. Age 40. At present located in Western New York. Box 7301.

STUDENT DESIRES PRACTICAL EXPERIENCE

Civil engineering student desires work during summer (or longer) as surveyor, timekeeper, clerk, typist, or any position where practical experience can be obtained on construction or mining projects. Will go anywhere for enough work to justify transportation expenditure. Two years' experience in all branches of surveying at college. Can furnish good references. Box 7404.

OPERATOR—PIT FOREMAN—DRILL FOREMAN

14 years' experience as shovel operator and pit foreman on coal stripping, railroad grading, highway grading, quarry and gravel pit work. Drill foreman on blast hole, tripper rod and air drills. Can operate oxy-acetylene cutting and welding torch. Can do own repair work. Age 41. Can furnish good references. Willing to go anywhere in U. S. A. Now located in Tennessee. Box 7101.

OPERATOR

15 years' experience on Erie, Keystone and Osgood gas machines. Can do own repair work. Willing to go anywhere in U. S. A. Box 7200.

SHOVEL OPERATOR

34 years' experience on Bucyrus, Osgood, Thew, Erie, Marion, Bay City steam or gas machines in rock quarry, coal stripping, R. R. ditching and grading. Can do own repairing and furnish excellent references. Married. Present location, West Virginia. Box 7402.

Trade Notes

Bucyrus-Erie Company, South Milwaukee, Wisconsin, announces the appointment of **Florida Machinery Corporation**, 2315 North Miami Avenue, Miami, Florida, as distributor for the sale of power shovels, draglines, cranes, clamshells, dragshovels and skimmer scoops from ⅜ to 2-yard capacity in Southern Florida.

Book Reviews

Wood Preservation—This subject has been comprehensively treated in a most interesting booklet just published by the **Tennessee Eastman Corporation**, Kingsport, Tennessee. It deals with the protection of wood against decay, dry rot, and termites. Those interested in wood as a building material will find a wealth of information in this new booklet. It takes up the various methods of preservation and sets forth definite recommendations for the different types of construction. Practically every page is illustrated with photographs and drawings to make it easily understood. The booklet is entitled "Preservation with Eastman No-D-K" and has been printed for the primary purpose of acquainting the public with this product. The engineer, contractor, and architect will be interested in the section devoted to the recommended methods of application. This booklet has so completely covered the subject that it has been appropriately termed a preservation guide. The booklet is free and will be mailed promptly upon your request to Tennessee Eastman Corporation, Kingsport, Tennessee.

Core Drills—Holes up to 72 inches in diameter and 50 feet deep can be drilled with the Calyx Core Drill, and the cores removed for study. Smaller holes (with their cores) up to 11½ inches in diameter and as deep as 2500 feet, can be produced. The Calyx Core Drill is described very completely and the results of its work is illustrated fully in a new 48-page bulletin just off the press. (Form 9501). Copies can be obtained from **Ingersoll-Rand Company**, 11 Broadway, New York, or any branch office.

Tractor Attachments—"Special Attachments for Special Needs" is the title of a new booklet released by **Caterpillar Tractor Company** illustrating and describing attachments ranging from bumpers to power take-offs and telling how they are used to add to the profit and satisfaction of tractor operation. The book is intensely practical, showing installation, application, and, in many cases, complete dimensions and operating data. Copies may be secured without charge, from the manufacturer.

Meeting Place of Capital and Labor

THE KOENIG LABOR AGENCIES

Established 1875

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612 Walnut St., Main 2766 and 2767

KANSAS CITY
501 Delaware St., Main 0796

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Up to 3 inches	$4.50	$4.00
Over 3 and up to 7 inches	4.25	3.75
Over 7 inches	4.00	3.50

Rates are net (no commissions, no discounts) and payable in advance of publication. Send your remittance with insertion order and copy.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards

LIMA MODEL 101—Combination 1¼ yard shovel and 40′ plus 10′ extension Dragline—powered with gasoline engine Model JK 6½″ x7″—4 cylinder. Shovel equipment practically new. Located Colorado. Box 599-SS.

THEW-LORAIN 75-B 1¼ CU. YD. gasoline shovel. A-1 condition. Located Texas. Box No. 565-SS.

THEW-LORAIN 75-A combination 1¼ yard Shovel and 50′ Boom Dragline including one yard Drag Bucket. Good condition. Located eastern Pennsylvania. Box 610-SS.

MARION TYPE 32 STEAMER, Shop No. 5676, 18′ boom, 15 dipper handle, 1¼-cu. yd. dipper shipped May, 1926, good operating condition. Box 451-SS.

BUCYRUS-ERIE 35-B ELECTRIC 24′ BOOM, 16′ Dipper Handle, 1½ cu. yd. Dipper, 3 phase, 25 cycle, 440 volt, Cat mounted. Box 544-SS.

BUCYRUS-ERIE 43-B GASOLINE CHAIN CROWD SHOVEL — 23′ boom — 17′ dipper handle—1½ cubic yard Vanderhoef dipper and teeth—electric starter—standard single shaft cat. Operated less than six months. Excellent appearance and condition. Will be demonstrated by owner. Located vicinty New York. No. 512-SS.

LORAIN—75-A—One cubic yard Gasoline Shovel. Good condition. Located Chicago. Box 676-SS.

LORAIN—MODEL 60—One cubic yard Gasoline Shovel. Good condition. Located Chicago. Box 677-SS.

BUCYRUS-ERIE MODEL B-2 High Lift Steam Shovel. Caterpillar mounted. Good working condition. Located northern New Jersey. Price very reasonable. Box 643-SS.

BUCYRUS-ERIE MODEL B-2 High Lift Steam Shovel. Caterpillar mounted. Very good working condition. Located South Carolina. Box 644-SS.

GA-2 SHOVEL, BUCYRUS-ERIE NO. 9918, 22′ Boom, 16′ Dipper handle, 1 cu. yd. manganese steel front inserted tooth dipper, 20-10 Gas Air single shaft drive, caterpillar mounted, 6¼x8″, 4 cyl. Waukesha Motor. Weight 71,900 lbs. Reconditioned. Located Greensboro, N. C. Price $5000.00. Box 595-SS.

BUCYRUS ERIE GA-2 Gas-Air High Lift Shovel—24′ Boom, 16′ Dipper Handle, 1¼ cu. yd. Dipper, Single Shaft Cat, Electric Starter. Waukesha 4-cylinder 6¼″x8″ Gasoline Engine. Reported excellent condition. Located West Virginia. 593-SS.

THEW LORAIN MODEL 75 SHOVEL. 24′ Boom, 18′ dipper handle, 1¼ cubic yard dipper. Gasoline. Machine now operating. Located central New York State. Box 665-SS.

BUCYRUS-ERIE LATE MODEL B-2 STEAM HIGH LIFT SHOVEL. 1 yard dipper—single shaft cat mounting. Good condition. Located near St. Louis. Box 518-SS.

MARION MODEL 450—1¼ Cu. Yd. Steam Shovel, Cat Mounted. New Gears on Caterpillar recently installed. Price favorable. 536-SS.

NORTHWEST MODEL 105 SHOVEL. Bargain Price. Located Texas. Box No. 566-SS.

NORTHWEST NO. 4—24′ Boom, 16′ Dipper Handle, 1 yard Dipper—Gasoline—Located eastern New York. Good condition. Box 660-SS.

BUCYRUS-ERIE GA-2—Gas-Air Combination High Lift Shovel and 50′ Boom Dragline Equipment, mounted on Single Shaft Cat. Good operating condition. Located at Shawnee, Okla. 537-SS.

BUCYRUS-ERIE MODEL 1035—Gasoline, Chain Crowd Shovel, Single Shaft Cat, 26″ Treads, Electric Starter, ⅞ Cu. Yd. Dipper. Now operating. Can be demonstrated. Located Massachusetts. 535-SS.

BUCYRUS-ERIE TYPE B STEAM COMBINATION SHOVEL-CLAMSHELL AND STEAM HOE. Machine completely rebuilt 1929. Good operating condition. Located near Boston. Box 517-SS.

GENERAL ½ cubic yard Gasoline Shovel—including 30′ Boom Clamshell and Dragline Equipment—New 1931—powered with Buda DW6 High Altitude Gasoline Engine. Excellent condition. Located near Denver. Box 588-SS.

BYERS MASTER SHOVEL — 26′ Boom, 17′ Dipper Handle, 1¼ cu. yd. Dipper, New January 1931. Good working condition. Located Melvern, Kansas — Highway 75 south of Topeka. Price very favorable. 591-SS.

BUCYRUS-ERIE GA-2 Gas-Air Extra High Lift Shovel—24′ Boom, 18′4″ Dipper Handle, 1¼ cu. yd. Dipper, Single Shaft Cat. Electric Starter. Excellent condition. Located eastern Pennsylvania. 592-SS.

BUCYRUS-ERIE—42-B Steam Shovel. Caterpillar Mounted, 21′ Boom, 15′ Dipper Handle, 1½ Cubic Yard Dipper, Power Boom Hoist. This machine excellent mechanical condition. Located Birmingham, Alabama. Can be demonstrated. Box 531-S.

TYPE "B" CAT. MOUNTED, equipped with 19′6″ boom, 16′ dipper stick and ¾ yard dipper, in good working order. Located near Hudson, Pennsylvania. Price $1750.00. Box 493-SS.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

2 BUCYRUS-ERIE—GA-2—Combination—45' Boom Clamshell—Crane machine and Extra High Lift Shovel equipment. Cat mounted—Self starter—All field rebuilt last year—Excellent condition—Located Eastern Pa. Box 485-SS.

BUCYRUS-ERIE 42-B STEAM SHOVEL—late model, 21' boom, 15' dipper handle, 1½ cu. yd. Vanderhoef dipper, boom hoist, dipper trip. Massachusetts standard boiler, cat mounting. Good operating condition. Now located and can be demonstrated at Colchester, Conn. Box No. 533-SS.

BUCYRUS-ERIE GA-2 Gas-Air High Lift Shovel. 24' Boom, 18'4" Dipper Handle, 1 cubic yard Dipper. Single shaft cat. Waukesha four cylinder gasoline engine. Excellent operating condition. Located North of Chicago. Box 645-SS.

BUCYRUS-ERIE GAS+AIR—22' Boom, 16' Dipper Handle, 1¼ cubic yard Dipper, Waukesha 6¼"x8" four cylinder gasoline engine. Single Shaft Cat mounted. First class condition. Located eastern New York. Box 601-SS.

BUCYRUS-ERIE Steam Combination Shovel and Clamshell Machine. Single shaft cat mounted. ¾ cubic yard Williams Clamshell Bucket included. Excellent mechanical condition. Located Virginia. Box 672-SS.

BUCYRUS-ERIE GAS-AIR TYPE GA-2 HIGH LIFT SHOVEL — 22'6" boom — 16' dipper handle—1¼ yard cast front inserted tooth dipper—single shaft caterpillar mounting—electric starter. Excellent condition. Field reconditioned. Waukesha 4-cylinder 6¼'x8" engine — New cylinder blocks and piston rings. Located near Scranton, Pennsylvania. Will demonstrate. Box 508-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL: 21' boom, 15' dipper handle, boom hoist, dipper trip, 1¼ cu. yd. Vanderhoef dipper, cat mounting, now located and can be demonstrated at Colchester, Conn. Very favorable price. Box No. 532-SS.

BYERS BEAR CAT—⅝ yd. Gasoline Shovel— Recently overhauled — Located Birmingham, Alabama. Box 480-SS.

P & H MODEL 600—1 yd. Gasoline Shovel— including 40' boom dragline equipment without bucket. Waukesha Engine. Recently overhauled. Located in Alabama. Box 483-SS.

NORTHWEST MODEL 6—1½ CU. YD. SHOVEL—22' Boom, 19' Dipper Handle, Caterpillar Diesel Model D-11000 6-cyl. Engine. Rebuilt early this year. Excellent condition. Located eastern Pennsylvania. Box 547-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21' Boom, 15' Dipper Handle, 1¼ cu. yd. Dipper, Power Boom Hoist, Cat mounted. Located New York City. Box 545-SS.

TWO (2) MODEL 301 STANDARD KOEHRING MACHINES, good operating condition. Now operating and can be inspected in southwestern Ohio. Price, $3,000.00 each. Box 540-SS.

LIMA MODEL 101—1¼ yard Shovel, Waukesha type WL Gasoline Engine. Very favorable price. Located Kansas City, Missouri. Box 598-SS.

LINK-BELT COMBINATION SHOVEL — CLAMSHELL — DRAGLINE — 1½ cubic yard capacity. 22' shovel boom, 16'6" dipper handle, 1½ cubic yard Esco dipper. 45' clamshell-dragline boom and 1 cubic yard Blaw Knox No. 618 clamshell bucket and 1½ cubic yard Esco drag bucket. Powered with Atlas four cylinder 7"x10½" 100 H.P. Diesel Engine. Very good operating condition. Recently overhauled. Working weight as shovel approximately 85000 pounds. Complete shipping weight 100,000 pounds. Priced right. Box 650-SS.

1 BUCYRUS-ERIE B-2 Steam ⅞ yard High Lift Shovel—Cat Mounted. Good operating condition. Located near Boston. Make offer. Box 521-SS.

BUCYRUS-ERIE 37-B 1½ cu. yd. Chain Crowd Shovel. Electric Starter. Battery lighting equipment. Wisconsin six cylinder 5½" x 6½" engine. Factory rebuilt less than six months ago. Practically new condition. Located Eastern Pennsylvania. Box 686-SS.

BUCYRUS-ERIE 43-B Gasoline combination shovel and dragline. 22' boom, 16' dipper handle, 1⅝ cu. yd. inserted tooth dipper and 60' boom dragline including 1½ cu. yd. Bucyrus-Erie drag bucket. Long caterpillars with 33" treads. Wisconsin six cylinder 6" x 7" Model E gasoline engine. About one year old. Excellent condition. Located Eastern Pennsylvania. Box 688-SS.

BROWNHOIST MODEL NO. 2 ½ cu. yd. rope crowd gasoline shovel. Waukesha four cylinder engine. Bargain price. Located near Peoria, Illinois. Box 689-SS.

BYERS-BEARCAT — Combination Shovel—Pull Shovel and Lifting Crane; Half swing. Gasoline power. Excellent condition. Located Detroit, Michigan. Box 690-SS.

KOEHRING Model 301 Gasoline Shovel. Located Southern Indiana. Box 691-SS.

KOEHRING MODEL 501 1¼ cu. yd. shovel and 50' boom dragline including 1¼ cu. yd. dragline bucket. Powered by Caterpillar Diesel D-11000 engine. Machine in excellent condition ready for immediate operation. Located Central California. Box 692-SS.

LORAIN MODEL 75 Combination 1¼ cu. yd. shovel and 50' boom dragline. Powered by Waukesha four cylinder 7¾" x 8" gasoline engine. Located Eastern Pennsylvania. Box 693-SS.

BAY CITY GASOLINE TRACTOR SHOVEL— ⅝ cubic yard capacity—including Pull Shovel Attachment. Powered with McCormick-Deering Unit. Located southern Alabama. Box 662-SS.

P&H MODEL 300 SHOVEL—18' Boom, 15' Dipper Handle, ⅝ cubic yard Dipper, manganese front. Powered with Waukesha B U 4½"x6¼" engine, power clutch control. First class operating condition. Located Massachusetts. Box 663-SS.

P&H MODEL 600—1¼ CUBIC YARD GASOLINE SHOVEL. Will be put in good operating condition. Located eastern Pennsylvania. Box 664-SS.

FOR SALE CHEAP

Marion Model 440 Gas Shovel and Dragline, 1 cubic yard capacity. For sale cheap. Located Missouri. Box 634-SS

GA-2 HIGH LIFT SHOVEL—24' boom, 16' dipper handle, 1¼ cubic yard dipper, on single shaft cat. Electric starter, Waukesha 4-cylinder 6¼"x8" gasoline engine. Reported excellent condition. Located Virginia. Box 623-SS

BUCYRUS-ERIE GAS SHOVEL—20'6" boom, 13' handle, ⅞ cubic yard, late model, Shop No. 10350. Good operating condition. Located eastern Minnesota. Available for demonstration. Priced right for quick sale. Box 670-SS.

TWO 1030 single motor ELECTRIC SHOVELS. 12'10" boom, 10'6" dipper handle, 1 yard rock dipper; also 40' boom crane equipment, 7'6" rear end clearance. Electric power supply 3 phase, 60 cycle, 440 volt. Located Philadelphia. Very good condition. Box 626-SS

Make an Offer

4 MARION SHOVELS

—No. 7 Gas-Electric, Combination Shovel and Crane. ¾ yard shovel dipper, 45' crane boom.

—No. 7 Gas-Electric, Standard ⅞ cubic yard shovel. Good condition.

—Model 480 Electric, Combination shovel and dragline. 70' boom and Type X Bucket,—2 cubic yard capacity. Shovel dipper 2 cubic yard. Good condition.

—Model 480 Electric Dragline. 70' boom, 2 yard X bucket. Good condition.

Box 698-SS

2 INSLEY ⅝ YARD GASOLINE SHOVELS. Located eastern New York State. Bargain prices. Box 574-SS.

OSGOOD MODEL 18 Steam—¾ yard shovel—Cat mounted. Just completely overhauled. Excellent condition. Located near Indianapolis, Ind. Box 522-SS.

MARION 1 YARD STEAM SHOVEL
Box 575-SS.

⅝ YARD SHOVEL

Universal ⅝ yard gasoline shovel—¾ swing. Good operating condition. Located Northern Michigan.
Box 636-SS

B-2 STEAM SHOVEL, CAT MOUNTED. 19'9" boom, 16' dipper handle, 1 cubic yard dipper. Good running condition. Located, Minnesota. Box 621-SS.

TYPE B STEAM SHOVEL, Cat mounted, 19'6" boom, 14' dipper handle, ¾ cubic yard dipper, also 36' clamshell boom and front drum and gearing. Located Kansas City, Missouri. Box 622-SS

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wis.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21' boom, 15' dipper handle, 1¼ cubic yard Vanderhoef front quarry dipper, power boom hoist. Cat mounted. Good condition. Located near Boston. Price very reasonable. Box 604-SS.

BUCYRUS-ERIE GA-2 Gas-Air—Extra high lift 24' boom—18' 4" dipper handle, 1 cu. yd. dipper. Single shaft cat mounting—air starter. Good condition. Located near Hartford, Conn. Box 523-SS.

1—Type B Bucyrus-Erie Combination High Lift Shovel and 40' Clamshell Machine.
1—Type B Bucyrus-Erie High Lift Shovel.
2—Type B-2 Bucyrus-Erie High Lift Shovels.
All located western Connecticut. Operating condition. Entire lot very low price. Box 573-SS.

KOEHRING MODEL 601 SHOVEL. Cat mounted. 24' boom, 18' dipper handle, 1½ cubic yard manganese front dipper. 20" Cat treads. Wisconsin 6-cylinder Model E, 6"x7" gasoline engine. Located Maryland. Box 631-SS

TWO KOEHRING MODEL 502 COMBINATION SHOVELS AND CRANES. Each equipped 21' boom, 16' dipper handle, 1¼ cubic yard dipper, 50' crane boom with 10' removable insert. Kohler light plant driven by 4-cylinder gasoline engine. Excellent condition. Only handled one job. Shovel equipment has seen very little service. Located Philadelphia. Box 632-SS.

LIMA 101 GASOLINE 1¼ YARD SHOVEL. Located eastern Pennsylvania. Good operating condition. Price reasonable. Box 576-SS.

MARION MODEL 450—1¼ YARD SHOVEL. AC-DC power. For 60 cycle, 3 phase, 440 volt current. Located eastern Pennsylvania. Price reasonable. Box 577-SS.

GENERAL COMBINATION SHOVEL-CRANE. Shovel Boom and Handle rebuilt. A-1 shape. ⅝ yard Dipper. 35' Crane Boom. 12 New Cat Tread Links. Cat mounting and general condition machine—good. Located Georgia. Price very reasonable. Box 578-SS.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards
Continued

TWO NORTHWESTS—MODEL NO. 2—Combination ½ cu. yd. shovel and 40′ boom dragline and clamshell. Gasoline powered. Located Southern Indiana. Box 694-SS.

P&H—MODEL 600—Combination 1 yard shovel and 40′ boom dragline including dragline bucket. Waukesha gasoline engine. Machine in fair operating condition. Located Georgia. Box 695-SS.

UNIVERSAL—MODEL NO. 35—½ cu. yd. shovel and 28′ boom clamshell including ½ cu. yd. Owens clamshell bucket. Powered by Waukesha four cylinder 4½″ x 6¼″ gasoline engine. Engine completely overhauled this year. Entire machine put in first class shape. Excellent condition. Located North Carolina. Box 696-SS.

UNIT—¾ CU. YD.—¾ swing—full caterpillar gasoline shovel. Good operating condition. Bargain price. Located Wisconsin. Box 697-SS.

NORTHWEST MODEL 105—1 YARD GASOLINE SHOVEL. Fair running order. Located Georgia. Bargain price. Box 579-SS.

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wisconsin

TYPE "R" INSLEY SHOVEL ½ yard capacity—full revolving. Cat mounted—4-cylinder Buda gasoline engine, 45 HP. First class mechanical condition. Ready to go to work. Very favorable price. Located Milwaukee. Box 629-SS

COMBINATION SHOVEL-DRAGLINE-CLAMSHELL
Northwest Model 3 Combination Shovel—Dragline and Clamshell, without buckets. Shovel equipment 22′6″ boom, 15′4″ dipper handle, ¾ cubic yard dipper. Equipped with Wisconsin B-2 4-cylinder 5¼″x6½″ gasoline engine. Completely overhauled July, 1934. Excellent condition. Box 635-SS

E-2 DIESEL SHOVEL—26′ boom, 15′ dipper handles, 1½-yard dipper. Atlas Diesel Engine. Located Massachusetts. Box 615-SS

P&H MODEL 700—1½ cubic yard shovel. Powered with Waukesha 150 h.p. Ricardo head 7½″x8″ gasoline engine. Good operating condition. Located New Mexico. Box 652-SS.

43-B GAS SHOVEL—22′ boom, 16′ dipper handle, 1¾ yard inserted-tooth dipper. Electric starter. Wisconsin 6 cylinder 6x7″ engine. Reconditioned—first class condition. Located, New York. Box 617-SS

Small Draglines
Under 2 Yards

P&H MODEL 775—70′ BOOM DRAGLINE including 1½ and 2 yard Omaha Buckets. Extra long Crawler. Excellent mechanical condition. No repairs needed. Located near Memphis. Box No. 489-SD.

THEW-LORAIN 75-A combination 1¼ yard Shovel and 50′ Boom Dragline including one yard Drag Bucket. Good condition. Located eastern Pennsylvania. Box 610-SD.

TWO P&H 700 DRAGLINES. 1½ cu. yd. buckets on 50′ booms. Gas and Diesel. Located Lower Rio Grande Valley, Texas. Box 618-SD

BUCYRUS-ERIE 32-B GASOLINE, 50′ boom, 1 cu. yd. dragline. Wisconsin six cylinder 5½″ x 6″ engine. Used less than one year. Excellent condition. Located Eastern Pennsylvania. Box 685-SD.

BUCYRUS-ERIE 43-B Special Gasoline Combination 70′ boom dragline including 1½ cu. yd. and 2½ cu. yd. Bucyrus-Erie drag buckets. High gantry. 33″ caterpillar treads, Electric starter, Wisconsin six cylinder 6″ x 7″ Model E gasoline engine. Has all modern improvements. Excellent condition. Located Eastern Pennsylvania. Box 687-SD.

KOEHRING MODEL 501 combination 50′ boom dragline, including 1¼ cu. yd. dragline bucket, and 1¼ cu. yd. shovel. Powered by Caterpillar Diesel D-11000 engine. Machine in excellent condition ready for immediate operation. Located Central California. Box 692-SD

LORAIN MODEL 75 Combination 50′ boom dragline and 1¼ cu. yd. shovel. Powered by Waukesha four cylinder 7¾″ x 8″ gasoline engine. Located Eastern Pennsylvania. Box 693-SD.

TWO NORTHWESTS—MODEL NO. 2—Comation 40′ boom dragline and clamshell and ½ cu. yd. shovel. Gasoline powered. Located Southern Indiana. Box 694-SD.

P&H—MODEL 600—Combination 40′ boom dragline and 1 yard shovel including dragline bucket. Waukesha gasoline engine. Machine in fair operating condition. Located Georgia. Box 695-SD.

INDUSTRIAL—BROWNHOIST—35′ Box Boom —½ cubic yard Dragline. Including Page M bucket. Self starter. Excellent operating condition. Rebuilt and thoroughly overhauled. Located New Orleans. Box 675-SD.

LINK-BELT COMBINATION DRAGLINE — SHOVEL — CLAMSHELL — 1½ cubic yard capacity. 22′ shovel boom, 16′6″ dipper handle, 1½ cubic yard Esco dipper. 45′ clamshell-dragline boom and 1 cubic yard Blaw Knox No. 618 clamshell bucket and 1½ cubic yard Esco drag bucket. Powered with Atlas four cylinder 7″x10½″ 100 H.P. Diesel Engine. Very good operating condition. Recently overhauled. Working weight as shovel approximately 85000 pounds. Complete shipping weight 100,000 pounds. Priced right. Box 650-SD.

Small Clamshells and Cranes
Under 2 Yards

BUCYRUS-ERIE 1030 GASOLINE 40′ BOOM CLAMSHELL MACHINE. Cat mounted. No Bucket. Recently overhauled. Guaranteed. Located Kansas City. Box 543-SCC.

KOEHRING NO. 2 GASOLINE CRANE. 45′ boom, 15 tons at 12′ radius. Wisconsin engine. Recently overhauled. First class working condition. Located Milwaukee. Box 630-SCC.

BYERS—BEARCAT—Half swing Clamshell Machine including bucket. Located vicinity Chicago. Bargain price. Box 674-SCC.

BAY CITY "PUP" CLAMSHELL MACHINE. Good operating condition. Box 514-SCC.

BYERS BEARCAT CLAMSHELL—Crane—30′ boom. Will handle ½ cubic yard bucket. Located near Grand Rapids, Mich. Box 648-SCC.

TWO NORTHWESTS—MODEL NO. 2—Comation 40′ boom clamshell and dragline and ½ cu. yd. shovel. Gasoline powered. Located Southern Indiana. Box 694-SCC.

UNIVERSAL—MODEL NO. 35—28′ boom clamshell and ½ cu. yd. shovel including ½ cu. yd. Owens clamshell bucket. Powered by Waukesha four cylinder 4½″ x 6¼″ gasoline engine. Engine completely overhauled this year. Entire machine put in first class shape. Excellent condition. Located North Carolina. Box 696-SCC.

O & S MODEL "T" ¾ yard clamshell machine. 40′ boom. Good working condition. Powered with Climax 5½″x7″ gasoline engine. Located near St. Louis. Good working condition. Box 651-SCC.

BYERS BEARCAT 25′ BOOM CLAMSHELL (¾ swing) and ½ cu. yd. Clamshell Bucket, including Trench digging attachment carrying ½ cu. yd. dipper. 24″ wide over cutters—will dig maximum 15′. Good operating condition. Very attractively priced. Located vicinity of Wilkes Barre, Pennsylvania. Box 494-SCC.

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wis.

NORTHWEST MODEL 105 Gasoline—40′ boom clamshell. Good operating condition. Located Iowa. Box 516-SCC.

LINK-BELT COMBINATION CLAMSHELL — DRAGLINE — SHOVEL — 1½ cubic yard capacity. 22′ shovel boom, 16′6″ dipper handle, 1½ cubic yard Esco dipper. 45′ clamshell-dragline boom and 1 cubic yard Blaw Knox No. 618 clamshell bucket and 1½ cubic yard Esco drag bucket. Powered with Atlas four cylinder 7″x10½″ 100 H.P. Diesel Engine. Very good operating condition. Recently overhauled. Working weight as shovel approximately 85000 pounds. Complete shipping weight 100,000 pounds. Priced right. Box 650-SCC.

Large Shovels and Draglines
2 Yards and Over

MARION MODEL 350 WARD-LEONARD ELECTRIC SHOVEL; 90′ boom 55′ dipper handle, 8 yd. dipper; truck mounted; for 3 phase, 60 cycle, 2300 volts; series motors; excellent condition; priced reasonably; location Northern Minnesota. Box 657-LSD.

SACRIFICE PRICES
2—50-B Bucyrus-Erie Diesel Draglines with 50′ Booms, Light Plants, Buckets, Used Approximately Eight Mos. on Light Work, Shop Nos. 10218 and 10219.
1—Back Hoe Attachment for 50-B.
Located in this district.
R. C. STANHOPE, INC.
101 W. 31 St. New York, N. Y.

50-B STEAM SHOVEL, Number 3946; equipped with 1½-cubic-yard dipper, 26-foot boom, also 1½-cubic-yard dragline bucket with 50-foot boom caterpillar mounted, equipped for burning oil, located at Texarkana, Ark. Price $3,000. Box 112-LSD.

68-C BUCYRUS ELECTRICALLY OPERATED SHOVEL, equipped with 2½-yard manganese front dipper, 3 phase, 60-cycle, 440-volt motors, transformers, cable, reel and approximately 1400 feet of cable all in excellent condition. Reasonable price. Address Box 268-LSD.

225-B SHOVEL, 6 and 7-yard dipper with caterpillars and track type equipment — in first-class condition. Located in northern Missouri. Box 452-LSD.

FOR SALE
CLASS 14 STEAM DRAGLINE with 2-yard Page bucket. Location Iowa. Very good condition. Surprisingly low price f.o.b. cars
ALSO
2-YARD MONIGHAN STEAM DRAGLINE in fair condition—cheap.
Box 419-LSD.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

MARION MODEL 350 W. L. SHOVEL. New 1923, 90′ boom, 56′ handle, 6 yd. dipper, 3 phase, 60 cycle, 2300 volts, series motors. Has handled about 1,000,000 yds. stripping. Good condition. Price approximately $50,000.00 f.o.b. cars, Iron Range. Box 656-LSD.

TYPE 175-B ELECTRIC, No. 794 equipped with 87′ shovel boom, 48′ dipper handle, 3½-yd. bucket, and dragline equipment including 125′ boom, and 3½-yd. bucket. This machine was recently reconditioned and is in good operating condition. Present location, Connecticut. Box 268-LSD.

BUCYRUS 320-B STEAM STRIPPING SHOVEL, shop number 4205, new in 1925, used less than four years. Located at Toronto, Ohio. Box 74-LSD.

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wis.

70-C BUCYRUS STEAM SHOVEL on Cats. Complete. In operating condition. Shop number 1712. Also one extra three-yard Manganese dipper and sticks. Chicago territory. Box 347-LSD.

FOR SALE OR RENT
TWO CLASS 14 STEAM DRAGLINES, caterpillar mounted, equipped for burning gas or oil. Located, Southwest. Price approximately $4,000 each. Box 619-LSD.

100-B STEAM SHOVEL, 3 yd. dipper, location Eastern Canada. Immediately available. Used—good condition. Box 669-LSD.

CLASS-24 BUCYRUS-ERIE STEAM DRAGLINE, shop number 912; 115-foot boom, 3½-cubic-yard Page bucket. Florida location. Box 73-LSD.

50-B STEAM BUCYRUS-ERIE
COMBINATION SHOVEL AND DRAGLINE

26′ Boom
17′ Dipper Handle
2 yard Dipper
50′ Boom Dragline Equipment
1 KW 32 Volt Moon Electric Light Plant
Boiler—Standard coal burning locomotive type 54″x9′7″
1¼ cubic yard Page Bucket

INCLUDING

2 steel under-frame flat cars on which machine now loaded. New 1929. Shop No. 10557. Moved only 200,000 yards material. Excellent condition. Deal direct with owner.

PRICE VERY ATTRACTIVE

Box No. 465 LSD.

MONIGHAN DRAGLINE MODEL T, 2-cubic-yard 60-foot boom located near Wichita, Kansas. About seven years old. Has recently been thoroughly overhauled. Box 180-LSD.

FOR SALE OR RENT

2-W Monighan Walking Dragline 65 foot boom, 2 yard bucket, 80 H.P. Fairbanks Morse Diesel engine. Used on three jobs. Excavated less than 200,000 yards. Present location on Mississippi River near Cairo. Accessible to barge. Can be demonstrated. Box 606-LSD.

Locomotives

LOCOMOTIVES

6 BALDWIN, 17x24, straight drive standard gauge 45 ton locomotives. 54 inch boilers. Shop numbers from 32,750 to 34,611. Each one has passed State Boiler Inspection yearly. Boilers will stand cold water test of 240 lbs. At present in actual service in Minnesota mine. Box 152-ME.

For Sale or Rent

Two 40-ton, 6-wheel switchers. Recently overhauled and rebuilt. Two 50-ton 6-wheel switchers. In excellent condition. Location Chicago. Box 306-ME.

Locomotive Cranes

TWO AMERICAN STEAM LOCOMOTIVE CRANES. Each 8 wheel—25 ton capacity. Each equipped with 8¼″x10″ double cylinder engine. Boom 50′. Steam brakes and train air line. Boiler 54″x101″ ASME—130 pounds pressure. Standard gauge 4′x8½″. Used only eight months. Splendid condition. Box 628-ME

BROWNING — 8 wheel Locomotive Clamshell Crane — 45′ Boom — 1 cubic yard Clamshell Bucket. Steam power. Good condition. 15 ton capacity. Box 678-ME.

Miscellaneous Equipment

BRAND NEW PAGE DRAG SHOVEL EQUIPMENT suitable for application to Bucyrus-Erie 1030, 1035, or 32-B machines now in the field, consisting of 17′1½″ boom, 11′ dipper handle, and two ¾ cubic yard dippers; one 38″ wide over cutters—the other 49½″ wide over cutters, together with auxiliary A frame and ropes. Priced below cost. Box 683-ME.

MONARCH—ALLIS-CHALMERS MODEL 75 gasoline powered caterpillar tractor. Bought 1930. Used about 60 days. Just like new. Box 681-ME.

HELTZEL TRAILER BATCHING BIN with volumetric measuring containers, conveyor belts and gasoline driven concrete mixer. New 1927—used very little. Box 682-ME.

PARTS—175-B Shovel—PARTS

1 Main Engine
1 Boom
1 Dipper Shaft
1 Crowding Engine
1 Five Yard Dipper

If interested in making a good buy on these shovel parts, write us. Box 607-ME.

COMPLETE EQUIPMENT for 2 strip mines, contractors or quarry operations, No. 300 and No. 36 Marion steam shovels, well drills, locomotives, cars, crushers, picking tables, loading booms, cable and button retarders, compressors, motors, transformers, flood and search lights, camp equipment and new repair parts for above. Box 195-ME.

4 LA PLANT CHOATE 6-yard, all-steel, dump wagons. Equipped with wide iron wheels. Price $100.00 each. Chicago territory. Box 349-ME.

MECHANICS MATHEMATICS

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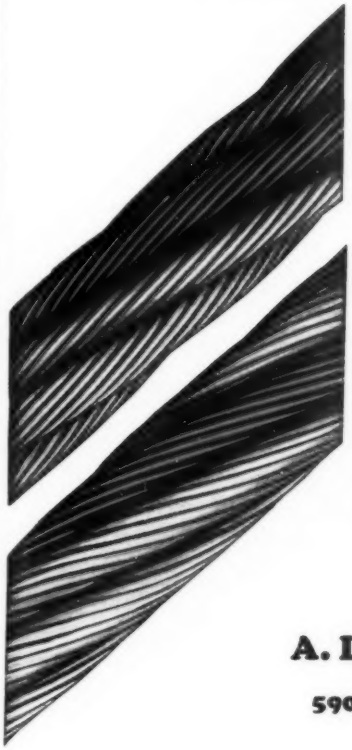

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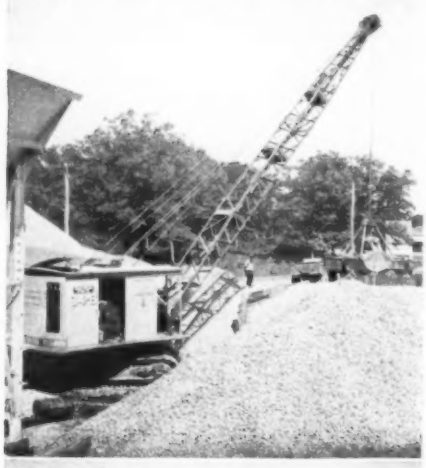

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34-B 1¼-yard; gasoline, Diesel or electric; shovel, dragline, clamshell, lifting crane, dragshovel. Gasoline engine, 6-cylinder, rated 115-H.P. Shovel with standard boom combination at 45° has maximum cutting radius 31'-6", clear dumping height 17'-9", working weight 84,400 pounds. Crane rating at 12' radius is 39,500 pounds. Dragline and clamshell usually use 1¼-yard bucket and 40-foot boom. Electro magnet for crane available.

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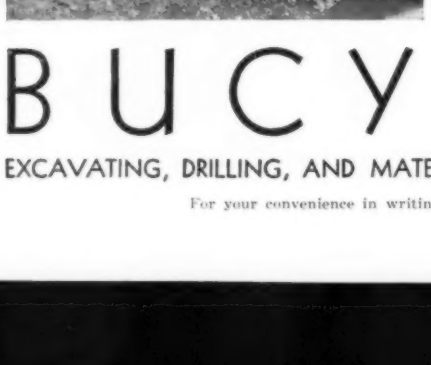

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